THE GOVERNMENT OF THE PHILIPPINE ISLANDS
DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES
BUREAU OF AGRICULTURE

TWENTIETH ANNUAL REPORT OF THE BUREAU OF AGRICULTURE

FOR THE FISCAL YEAR ENDED DECEMBER 31, 1920

ADRIANO HERNANDEZ
DIRECTOR OF AGRICULTURE

MANILA
BUREAU OF PRINTING
1919

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LIST OF ILLUSTRATIONS

TWENTIETH ANNUAL REPORT OF THE BUREAU OF AGRICULTURE

MANILA, *February 15, 1921.*

SIR: I have the honor to submit herewith the Annual Report of the Bureau of Agriculture for the fiscal year ended December 31, 1920. All statistics on crop production, hectarage and value as quoted herein are, however, based on the fiscal year ending June 30, of each year.

PHILIPPINE AGRICULTURE

GENERAL SUMMARY

It is gratifying to state that never before in the history of Philippine agriculture has there been greater prosperity among the farmers, nor has there been a year in which greater progress has been made in agriculture, than that of the year 1920. The increase in area planted to crops, the corresponding increase in yield, and the stupendous increase in value received, make a new record in advancement for this important industry. There are many causes leading up to this remarkable development. The Food Campaign which has been carried on for some time is an important factor. This has been aided by the Rice and Corn Fund which has stimulated increased production of these important cereals. The introduction of modern tractors and gang plows has become quite general in the sugar-producing provinces and will no doubt be extended to the rice fields more generally just as soon as irrigation project are completed, thus making their use practicable. Seed selection has been another important factor in increasing yields. The upgrading of livestock by the importation of pure bred sires has had a share in improving conditions. The establishment and remarkable growth of Rural Credit among the small farmers has taught many of them the much-needed habit of saving a part of their scanty funds and has furnished financial aid to many members who could not have obtained it otherwise. The establishment of poultry-swine stations, provincial and municipal nurseries, the increasing of the Bureau's field force of farm advisers and agricultural inspectors, has brought a better knowledge of farming

to those most interested. There have been no serious invasions of locusts, due to the activities of the work of the Plant Pests Control Division, which has likewise organized a plant quarantine service to prevent the introduction of plant pests through importation.

There are many other causes that have contributed to the general prosperous condition of agriculture, but the above are among the most outstanding. That there may be no question as to the advancement made in Philippine agriculture during recent years and more especially during the year of 1920, the following figures are quoted: From the year 1910 to 1920 there was an increase of 45% in the area in cultivation, for the six leading crops, rice, corn, abaca, sugar, coconuts, and tobacco. During the five-year period, 1915–1919, the average yields of these crops per hectare were as a whole 21% greater than those for the preceding five-year period, 1910–1914, and the yield per hectare for the year 1920 was 4% above that for the high period of 1915–1919, notwithstanding the damage sustained through typhoons and floods. The above figures give some idea of the advance that has been made both in area and in yield, but an even greater gain has been made in value. The following table showing the value of the six leading crops of the Islands, tells the story eloquently. Note the steady yet swift upward climb.

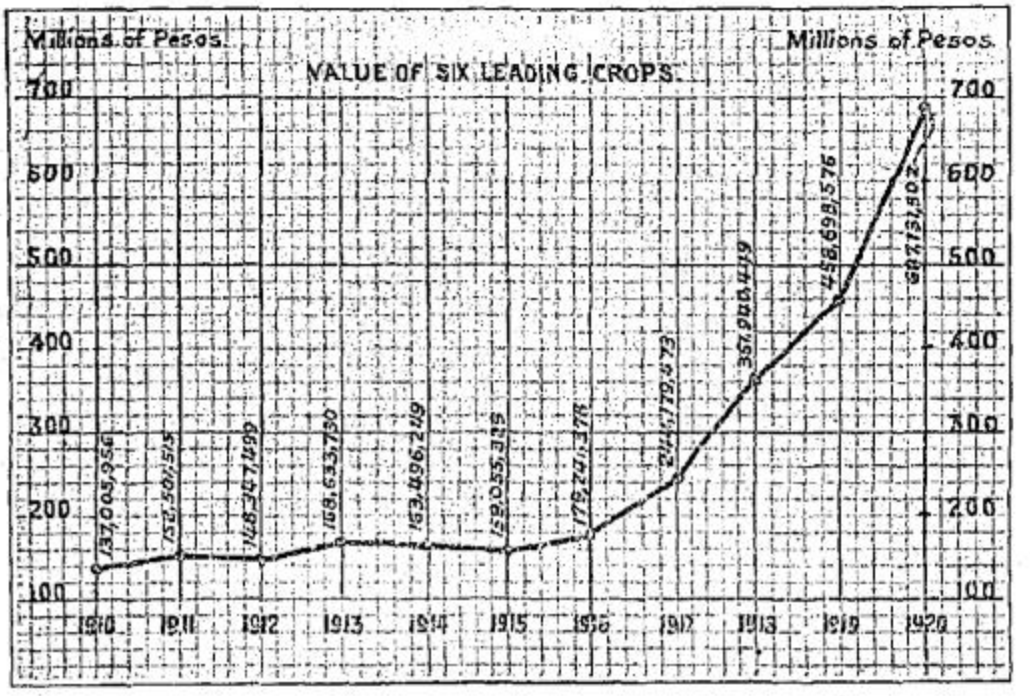
Year	Total value, 6 crops.
1915	₱159,055,329
1916	179,241,378
1917	244,179,473
1918	361,940,449
1919	458,698,576
1920	687,131,502

The graphic chart on page 13 shows the advance even more clearly.

Much of this increase in money value of Philippine products was unquestionably due to prevailing high prices during and after the World War, but it should be remembered that there was also an increase in hectarage and in yield, which cannot be attributed to price inflation. The agricultural accomplishments of the year 1920 will no doubt stand as a record for some years to come.

CROP CONDITIONS

The results obtained during 1920 were significant not only in showing that better methods have produced better yields, but also that farmers displayed fortitude in the face of adverse weather conditions that prevailed during a part of the year and won their victory against great odds. Several typhoons cul-



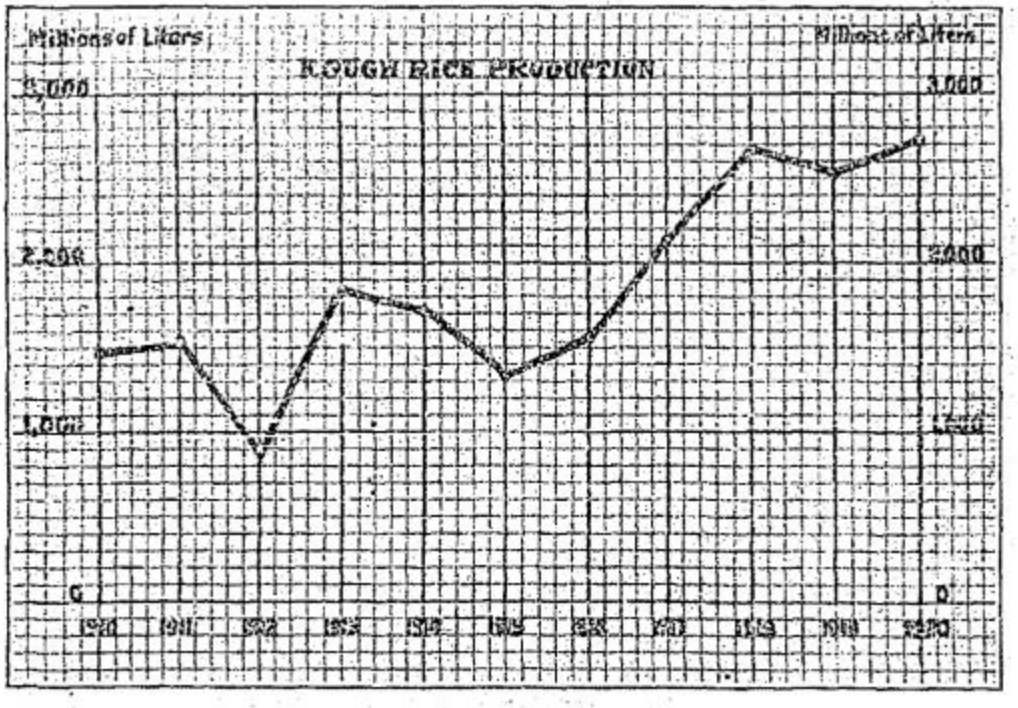
minated in extraordinary floods coincident with the time for planting and transplanting rice. For a time the situation seemed quite serious, but devastated fields were replanted, sugar cane fields were planted to corn, and by unceasing work thus made necessary, and in spite of a shortage of hired labor, they came out victorious.

Rice.—The most notable success of the year in relation to the economic status of the Islands as regards the food supply, was in the production of rice. For three-quarters of a century the production of this cereal always fell short and of late years this shortage increased. The following table showing production and imports of rice will give some idea of the advance made during the past year toward meeting the demands for home consumption.

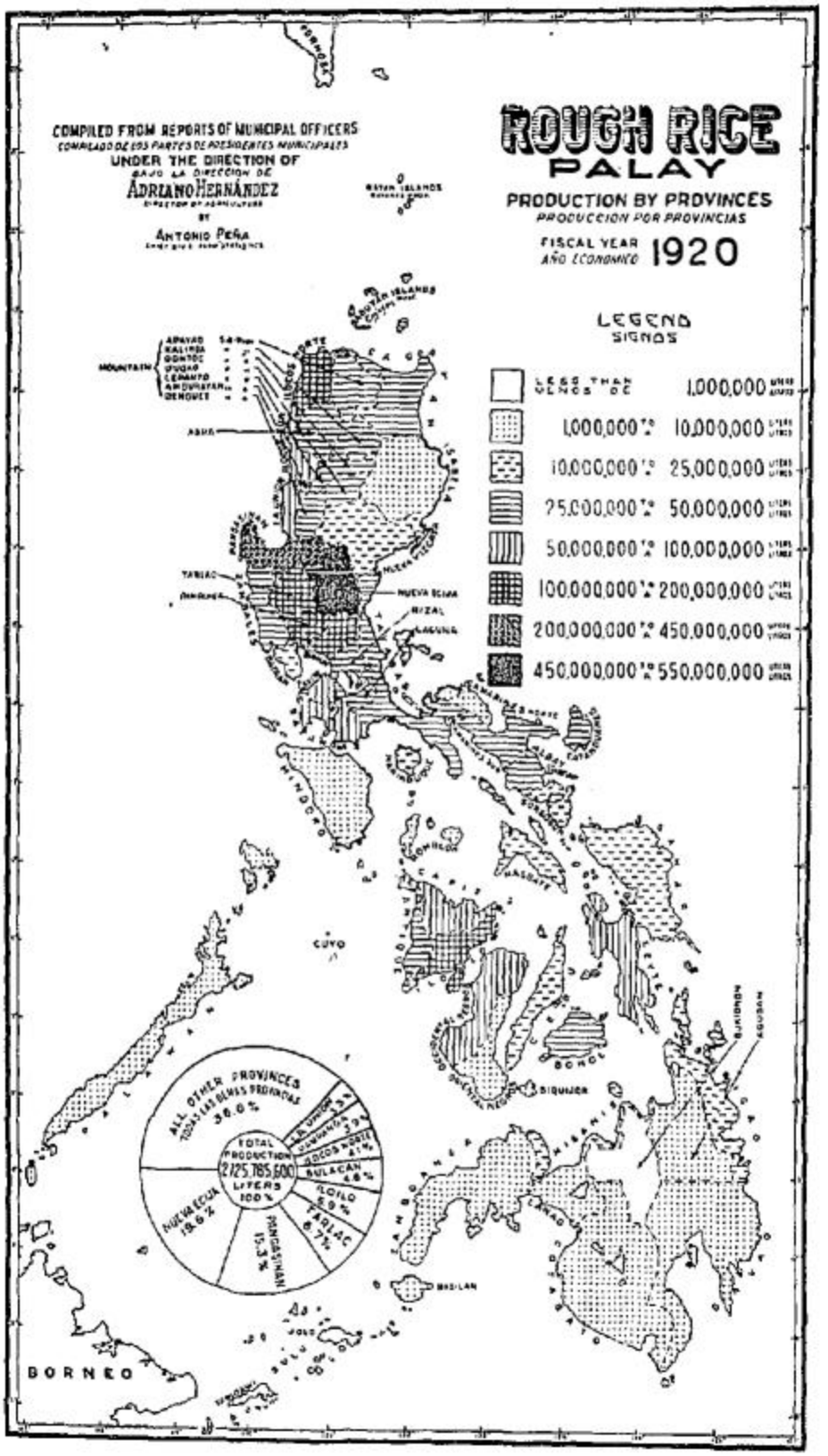
Cleaned rice

Year	Production in kilos	Importation in kilos
1910	528,054,408	184,619,932
1911	574,842,688	203,082,707
1912	325,429,104	260,249,653
1913	685,968,024	179,204,906
1914	636,630,792	81,788,027
1915	498,917,748	175,541,102
1916	584,608,192	183,016,248
1917	791,748,607	179,912,493
1918	1,004,007,385	159,130,511
1919	947,534,047	148,724,258
1920	1,019,899,503	11,018,137

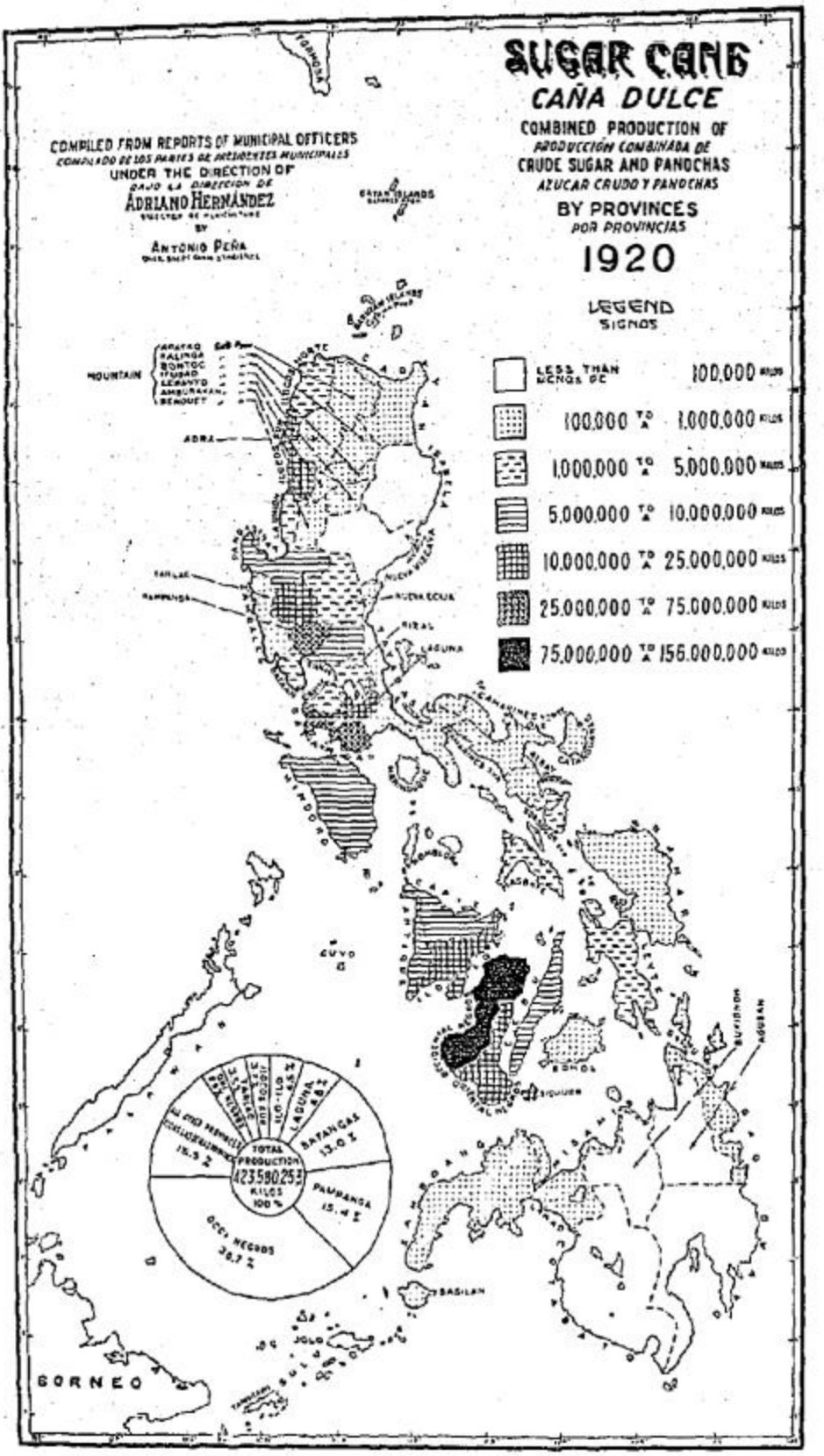
The production of rice for 1920 was 8% greater than that of the previous year and 33% more than the average for the five-year period 1915–1919, while importations dropped from 148,724,258 liters in 1919 to only 11,018,137 liters for 1920. The total value of the 2,725,785,600 liters of rice grown in 1920 brought the growers the enormous sum of ₱254,855,385 in municipal markets, which was an increase of 37% over the total value of the previous years crop. The production of palay or rough rice during the period from 1910 to 1920 is quite clearly set forth in the following graphic chart:



Sugar.—Due to adverse weather conditions there was a decrease of 2,796 hectares in the area planted to sugar cane, a decrease of 1% compared with the preceding year, yet the yield and value of the crop made a record figure. The total production of sugar for the year amounted to 423,580,253 kilos. The hectarage was 197,403, and the sugar produced sold in municipal markets for ₱159,257,117. Compared with the previous year there was a decrease of 1% in area cultivated yet a gain of 3% in production and a phenomenal increase of 114% in value. Of the total production, less than 53,446 kilos were refined sugar, 82,555,355 kilos were centrifugal, 76,983,346 kilos were muscovado in pilones, 232,270,824 muscovado in bayones and 31,717,252 kilos in *panocha*. There were also 4,095,979

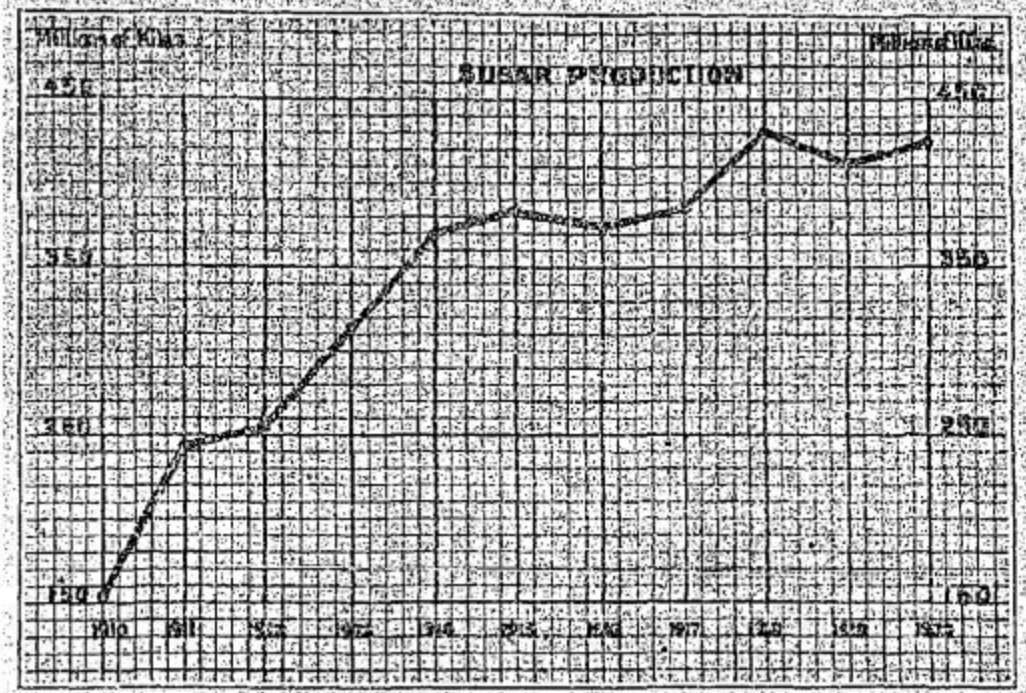


Map showing rough rice production by provinces

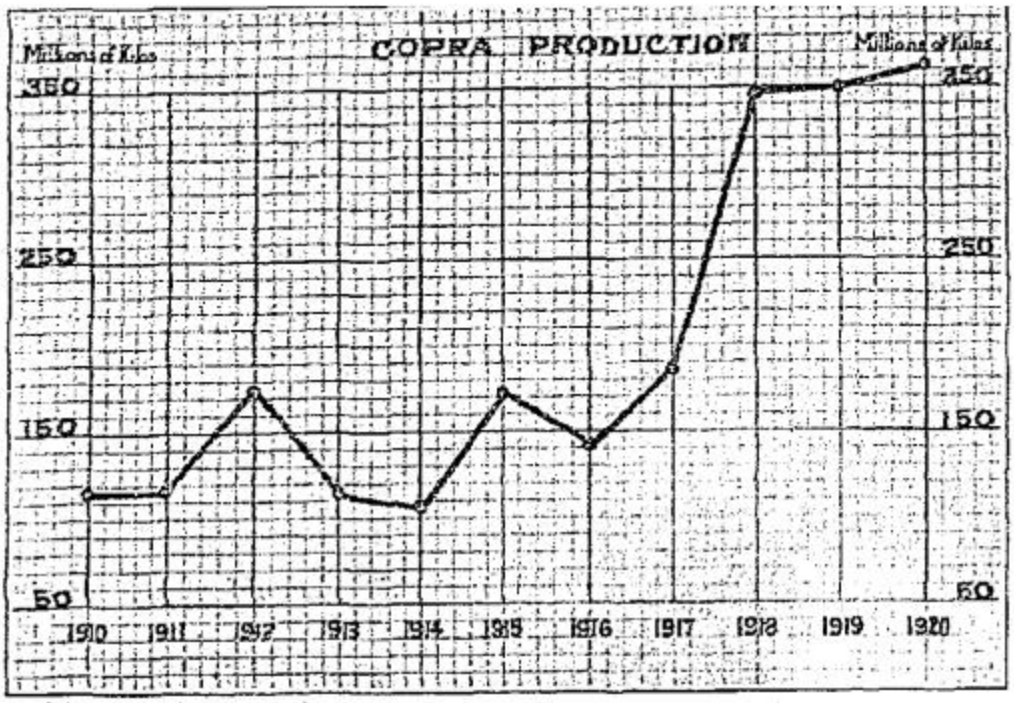


Map showing sugar cane production by provinces

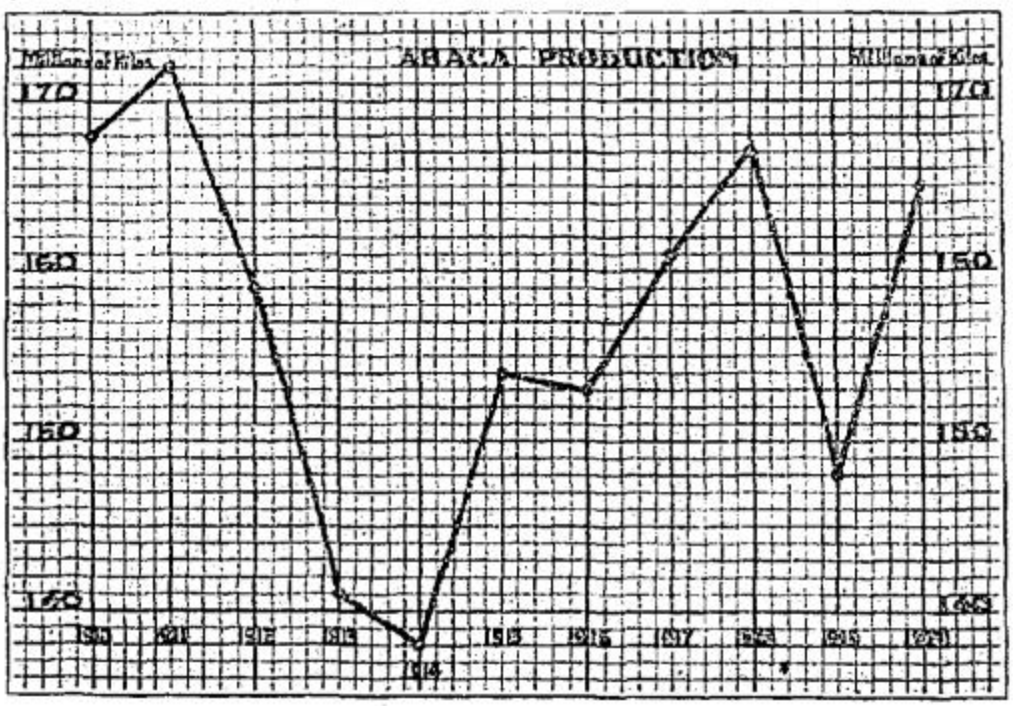
liters of molasses and 10,069,812 liters of *basi*. The following chart shows clearly the rise in sugar production during the past ten years.

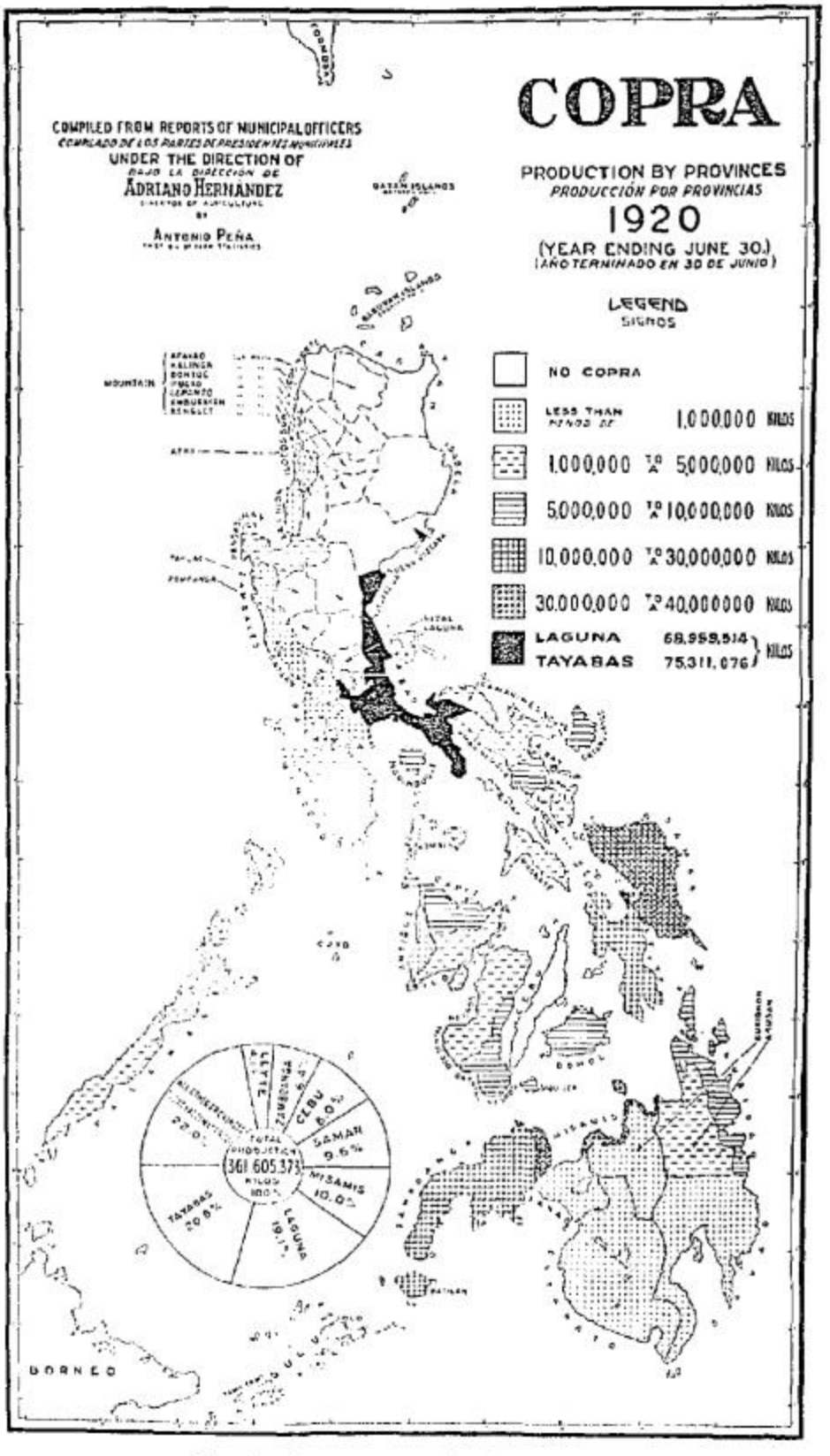


Coconuts.—This crop has likewise made a new record during the year, not only as to the number of trees but also as to the production of copra and the value of its by-products. At the close of the fiscal year there were 79,406,104 coconut trees planted, as against 74,650,102 for the previous year. Although there was a decrease in the production of home-made coconut oil and also a decrease in the production of *tuba*, there was a substantial increase in the production of copra which more than offset the loss sustained from other by-products. The reduction of production of home-made coconut oil was due to the considerable waste in producing it by crude methods, therefore increasing the expense of the product. Modern coconut oil factories turn out a superior grade of oil at a lower price. The year's produce of copra was 361,605,373 kilos, of which 381,903 kilos were steamed copra, 197,692,988 kilos, smoked copra and 163,530,472 kilos, sun-dried. The total value of the crop for 1920 was ₱128,198,891 as against ₱75,438,291 for the previous year, a gain in money value of over 70 per cent. The accompanying chart shows the big advance in production during recent years.

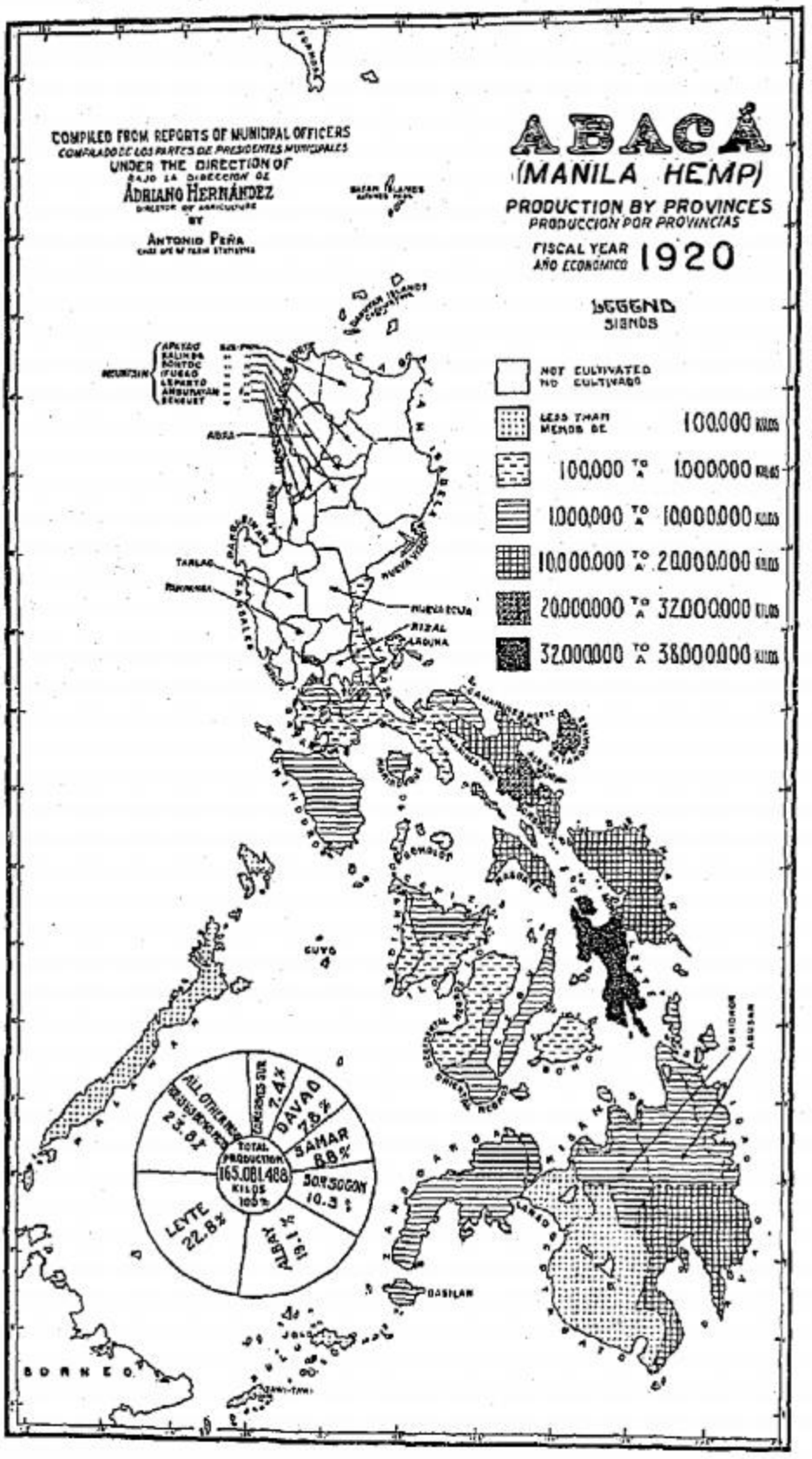


Abaca.—Despite falling prices there was an increase in the area devoted to this crop. The figures for 1920 being 559,356 hectares as against 515,563 for the preceding year. While production increased from 148,340,800 kilos in 1919, to 165,081,488 kilos in 1920, due to low prices, the crop brought only ₱65,006,006, a decline of 3% over the previous year in the face of an increase of 11% in production. The follow-





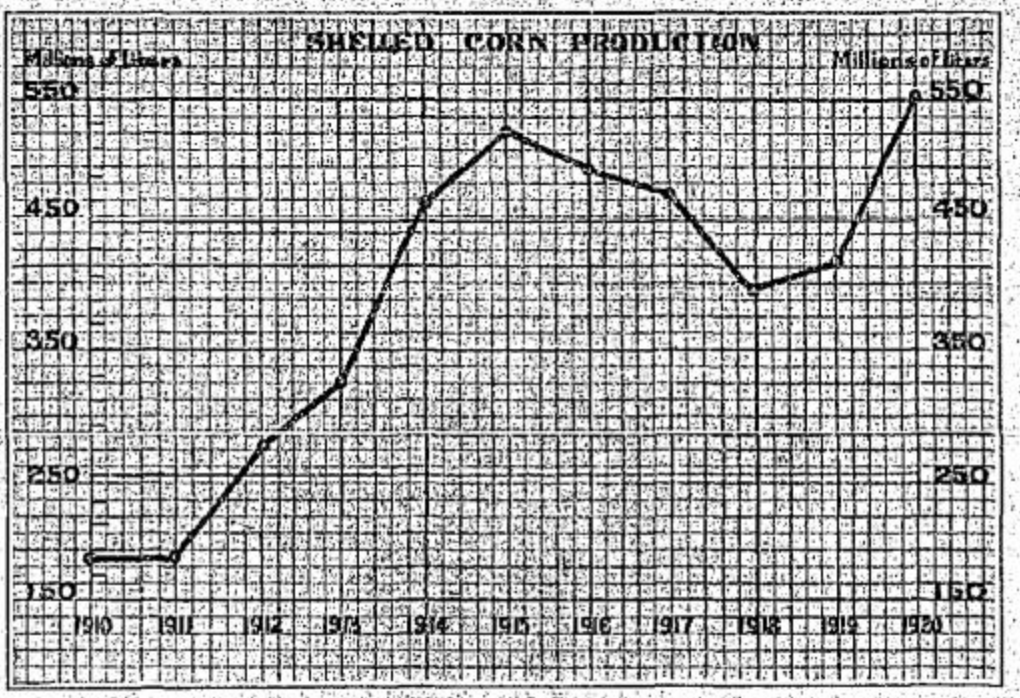
Map showing copra production by provinces



Map showing abaca production by provinces

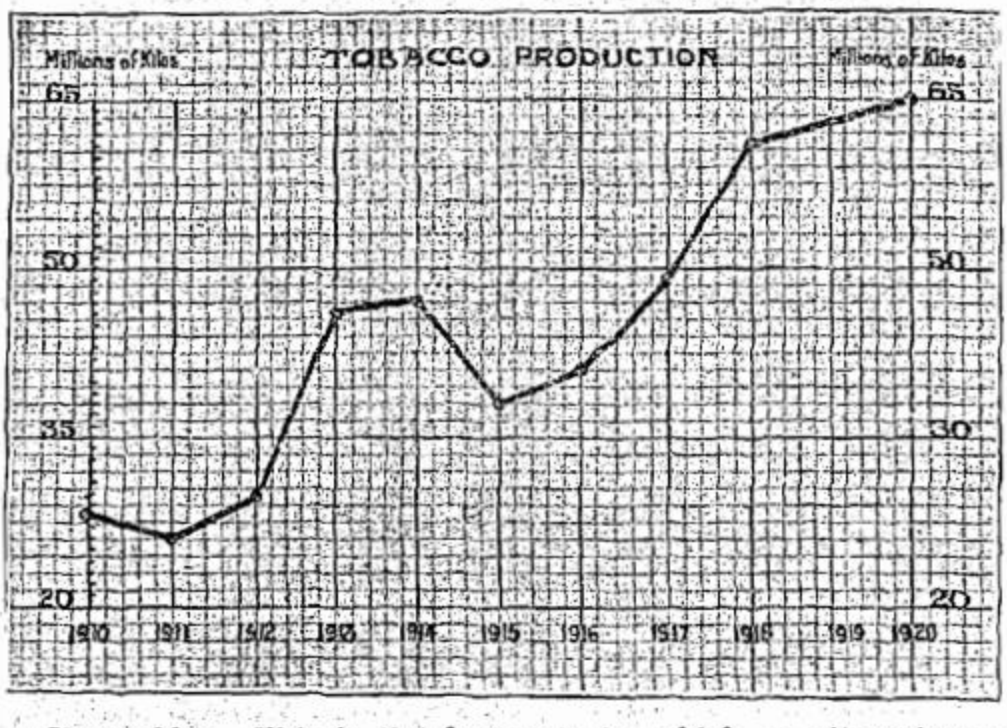
ing chart shows clearly the fluctuations in the production of this important crop since 1910.

Corn.—There were 537,135 hectares planted to corn in 1920, yielding 552,907,350 liters of shelled corn which sold for ₱50,910,867, which is an exceptionally good showing, when it is considered that floods and typhoons materially damaged the crop in many localities. The accompanying chart shows that in 1920 corn production reached the highest mark obtained during the past ten years.



Tobacco.—This crop, although least in value of the six leading crops shows an increase, not only in area in cultivation, but in production and value as well. Producers this year raised 64,893,534 kilos of leaf tobacco, valued at ₱26,765,947, from 101,123 hectares, against 56,497,748 kilos, worth ₱17,585,449 from 73,859 hectares in 1919, being an increase of 15% in production, 37% in area, and 52% in value. Tobacco production during the past ten years also reached its maximum during the past year, as will readily be seen from the chart on page 18.

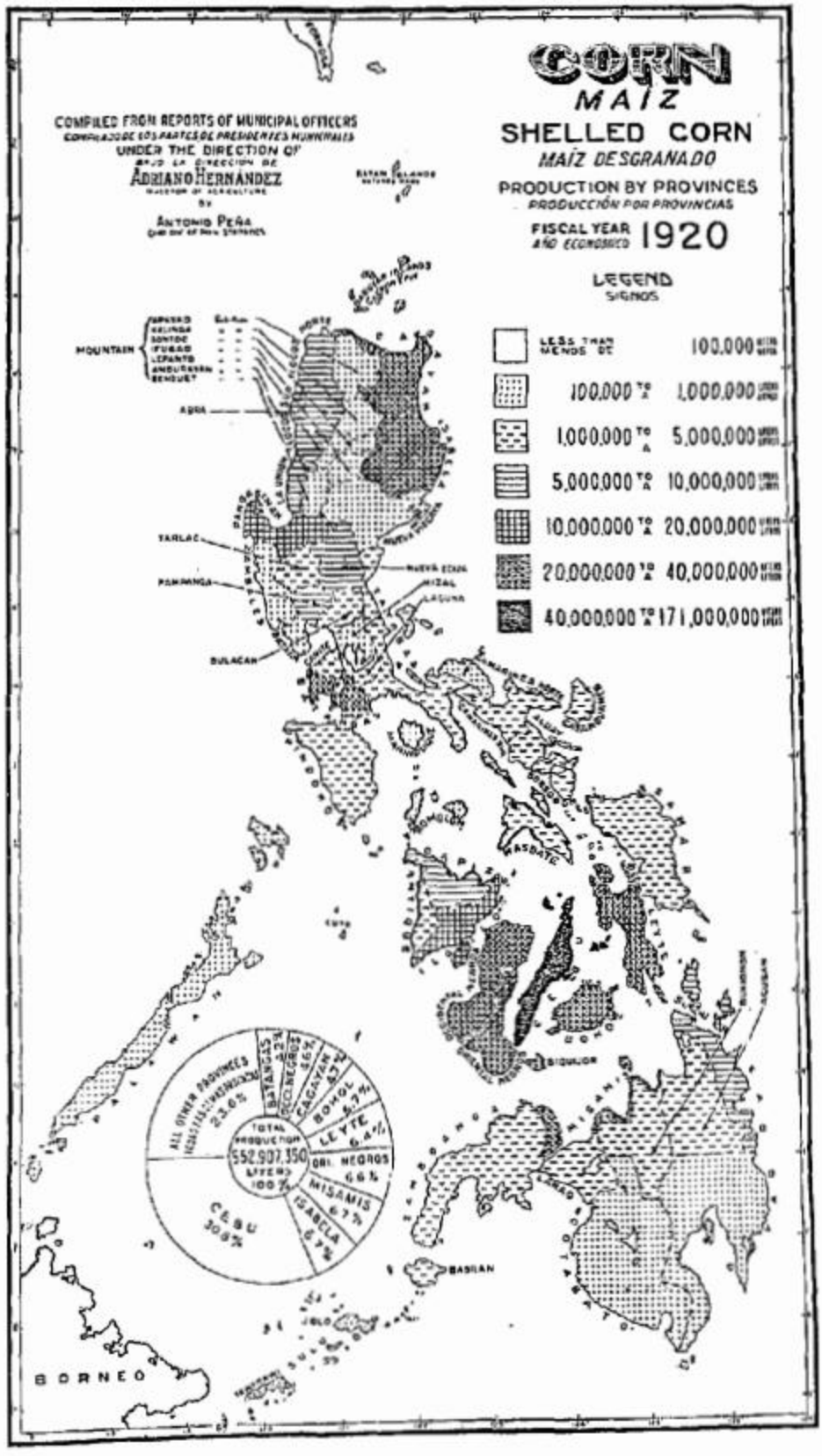
Maguey.—Because of increasing demand for substitute fibers, the maguey crop of the past year made a marked advance. There were 30,567 hectares as against 28,465 for 1919. There were 18,178,050 kilos as against 12,318,392 for the previous year, and the value of the crop jumped from ₱1,919,750 in 1919 to ₱3,407,959 in 1920. The gain therefore amounts to 7% in area, 47% in production, and 78% in value.



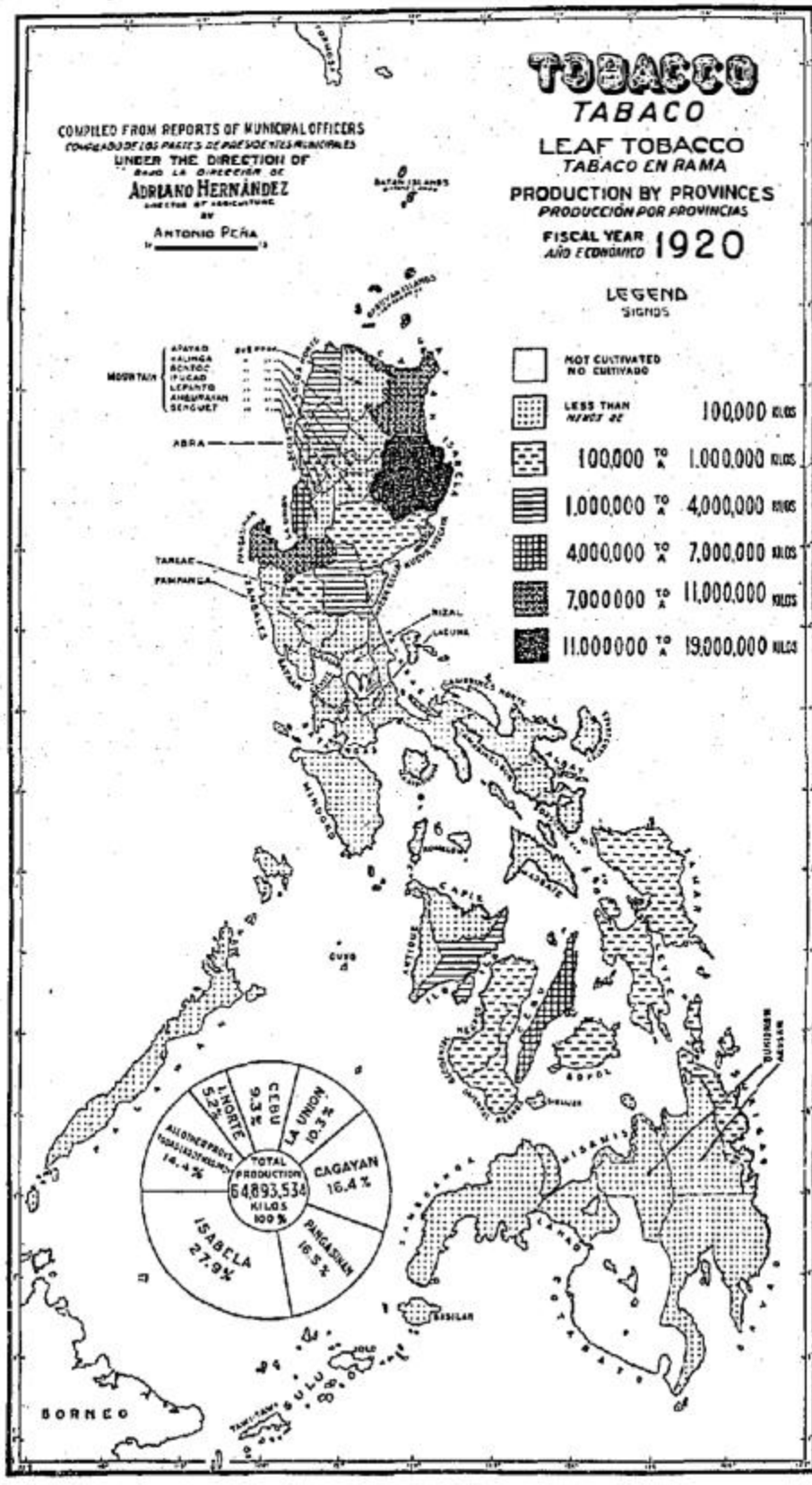
Vegetables.—This is the first year in which an attempt was made to collect data on vegetables and root crops, no comparison with other years is impossible, and although but few vegetables are grown commercially, the aggregate planted this year and the value of the product is of economic importance, the total area being 141,211 hectares, and the estimated value being ₱11,262,740. The following table is therefore interesting:

Crops	Area cultivated Hectares	Value in pesos
Beans	6,422	560,860
Cabbage	840	108,200
Cassava	9,194	1,485,000
Eggplant	6,265	476,280
Gabi	9,659	1,038,600
Irish Potatoes	203	5,680
Mongo	25,125	1,242,500
Peanuts	4,406	664,400
Radish	2,306	261,460
Sweet Potatoes	63,386	3,638,412
Tomatoes	6,706	821,400
Tugui	1,403	87,200
Ubi	4,242	716,000
Forage Grass	1,054	156,748
Total	141,211	11,262,740

Livestock.—Contrary to common belief, the Bureau's figures show that increases in the number of carabaos, cattle, horses, hogs, goats and sheep have been registered steadily since 1910, despite serious epidemics of epizoötic diseases. The current be-



Map showing corn production by provinces



Map showing tobacco production by provinces

lief that animals have decreased, due to long and continuous infestations, is correct, for figures compiled regularly show that since 1910, carabaos have increased 96%, cattle 178%, horses 79%, hogs 90%, goats 73%, and sheep 89%, as shown by the following table:

Year	Carabaos	Cattle	Horses	Hogs	Goats	Sheep
1910	705,758	243,180	138,199	1,637,338	422,185	88,805
1911	809,267	289,771	146,641	1,661,931	441,325	92,617
1912	911,318	337,202	162,383	1,735,047	476,638	97,640
1913	1,047,164	418,114	179,089	2,016,736	529,180	104,147
1914	1,147,433	477,736	215,826	2,285,880	592,042	118,010
1915	1,221,966	534,123	223,195	2,521,143	644,562	129,509
1916	1,228,836	567,456	203,364	2,734,803	661,859	142,091
1917	1,271,208	603,107	214,209	2,810,737	722,532	155,827
1918	1,338,082	601,297	234,041	2,894,403	741,077	165,686
1919	1,388,244	678,525	255,380	3,129,676	731,849	168,181

CROP PROSPECTS

As prices were still rising at the time of the season for planting sugar cane, rice and corn, the growers greatly increased the area in cultivation in the face of such difficulties as shortage of cane points and labor, and in many places heavy rains and floods. The great clump in values will be heavily felt in the marketing of 1921 crops, as there seems sure to be an increase of production over the splendid record of 1920. In rice, alone, it is estimated that there will be an increase of at least 5% if weather conditions are favorable, the forecast of the crop being 38,144,528 cavans of rough rice, or 1,019,399,503 kilos, of cleaned rice. Even greater production of sugar is predicted, as new lands have been opened up, rice and corn lands have been planted to cane, the increase being estimated at as high as 30% over that of 1920. Copra production will equal if it does not surpass that of 1920, and with the area planted to corn increased by 20,000 hectares, greater production is almost a certainty. Abaca is the only exception in the great forward march. Declining prices have discouraged growers, who will probably turn their attention to other crops in the hope of securing better returns. A decline of possibly 20% in abaca production may result.

Opposed to this optimistic outlook for production is the factor of falling prices and readjustment of values that were inflated by the war. It is a condition world-wide in its effect, therefore not confined to the Philippines nor even to the farming industry. The outcome, no one may predict with a certainty at this time. Even with falling prices, and readjustment of values, the increased production will be helpful and the future holds much of promise for a fair measure of prosperity.

BUREAU OF AGRICULTURE

PERSONNEL

Among the important changes in the directorate of the Bureau of Agriculture, was the resignation of Mr. José G. Sanvictores as Assistant Director, effective May 31, 1920, who was succeeded by Mr. Silverio Apostol, former chief of the Plant Industry Division, effective December 21.

Mr. Manas y Cruz succeeded Mr. Apostol as Chief of the Plant Industry Division, effective December 21.

On October 31, 1920, Dr. A. S. Shealy, Chief of the Animal Husbandry Division transferred to the University of the Philippines and on November 16, 1920, Mr. Alfonso Tuason was promoted to chief.

Mr. Cyrus Padget required from the service as Supervising Fiber Inspector on the date of the expiration of his contract, March 31, 1920.

During the year there were 602 Filipinos appointed to the service, 109 being permanent employees and 493 temporary. During the same period there were 57 Filipinos separated from the permanent service and 220 from the temporary list. But one American was appointed during the year and six were separated from the service, three each from the temporary and permanent lists.

ORGANIZATION

There were no changes in the organization of the Bureau during the year, the plan as adopted August 1, 1919 being followed throughout the year. Under this organization diagram the activities of the Bureau were arranged as follows:

ADMINISTRATIVE DIVISION

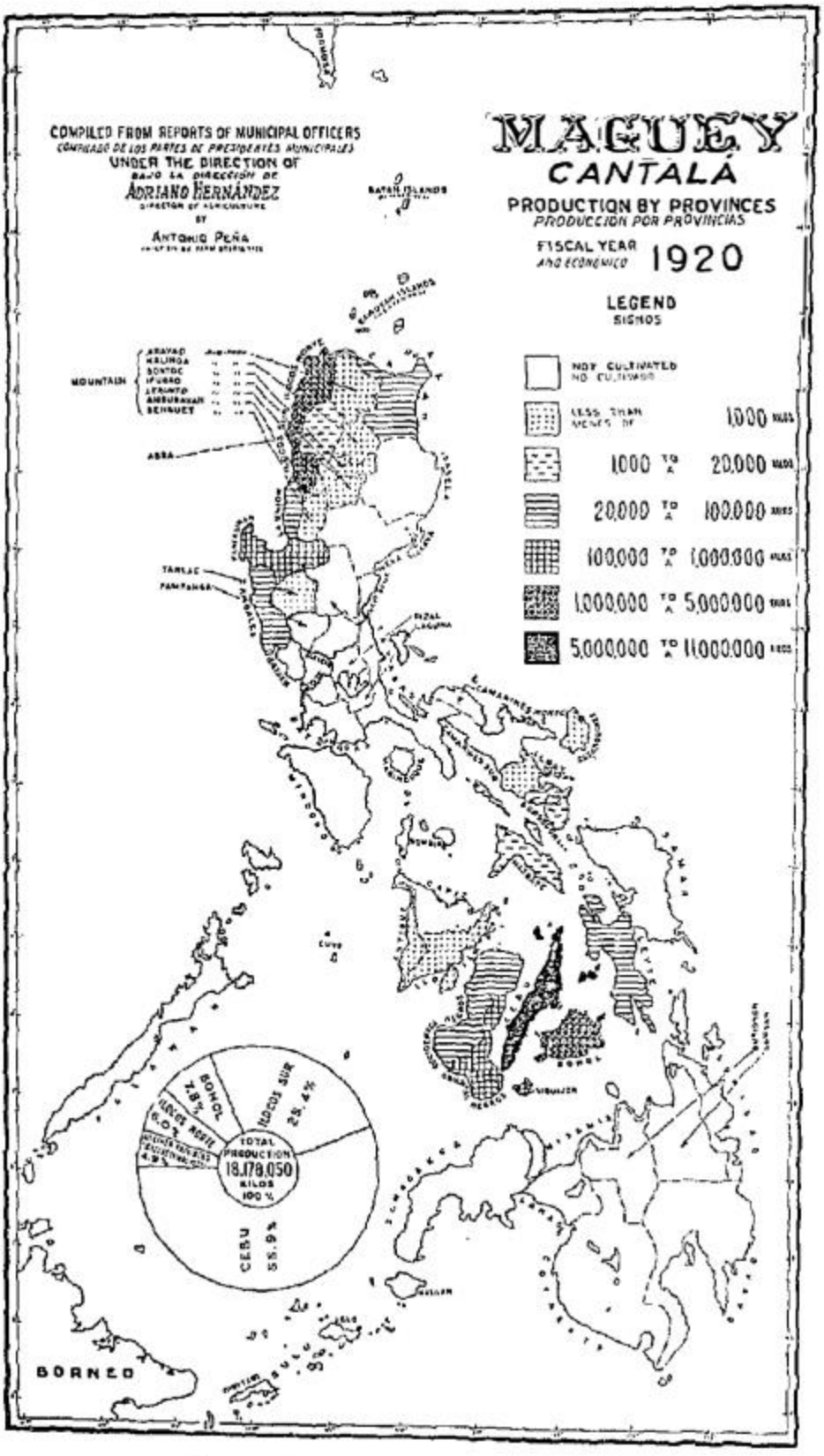
General Service Section
Records Section
Transportation and Repair Section
American Colony Section

ANIMAL HUSBANDRY DIVISION

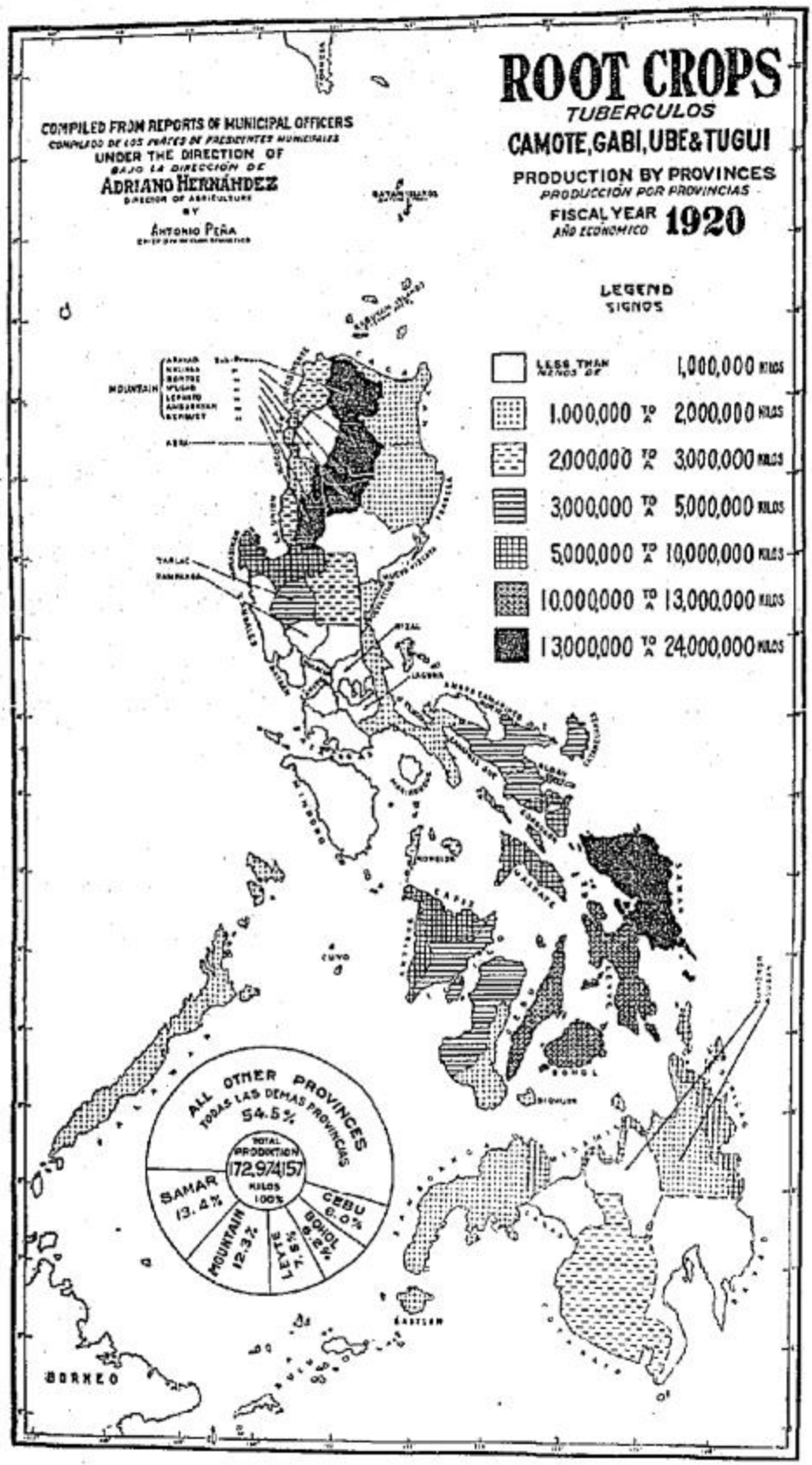
Improved Breeding Section
Animal Selection and Distribution Section
Poultry Selection and Distribution Section

VETERINARY DIVISION

Disease Control Section
Quarantine and Meat Inspection Section
Veterinary Research Section



Map showing maguey production by provinces



Map showing the production of root crops by provinces

ACCOUNTING DIVISION

PROPERTY DIVISION

DIVISION OF PUBLICATIONS

DEMONSTRATION AND EXTENSION DIVISION

Agricultural Demonstration Section
Agricultural Extension Section

RURAL CREDIT DIVISION

PLANT PESTS CONTROL DIVISION

FARM STATISTICS DIVISION

PLANT INDUSTRY DIVISION

Agronomy Section
Horticulture Section

ANIMAL INSURANCE DIVISION

FIBER DIVISION

Fiber Investigation Section
Fiber Inspection Section

ADMINISTRATIVE DIVISION

GENERAL STATEMENT

The work of this division, which includes a general supervision of all stenographic work, the handling of all correspondence of the Bureau, the preparation of the estimate for the annual appropriation and the apportionment of the same, the supervision of transportation, the general records section, the keeping of the efficiency records, administration of the affairs of the American Colony at Momungan, the rental of buildings, light, water and janitor service and a general supervision of the affairs of the central office, has been greatly increased during the year, due to the increased activities in all departments.

CORRESPONDENCE

During the year there were 173,932 communications handled, 142,489 of which were letters sent and 31,443 were letters delivered. A total of 8,384 letters were delivered by messengers to different branches of the Government service. The cost of the transmission of correspondence through the mails was ₱11,083.44 for letters and ₱2,862.37 for telegrams, a total of ₱13,945.81, as against ₱10,112.79 for the previous year.

TRANSPORTATION

This office is in charge of all land transportation equipment of the Bureau in Manila and furnishes transportation to the personnel of the central office not only within the city limits but to suburbs and nearby provinces as well. The superintendent of this office also has charge of the repairs shop, carpentry work and blacksmithing. An economy has been effected as to certain parts and accessories for automobiles, motorcycles and bicycles, by having them made by our own mechanics in the repairs shop.

The cost of operation and maintenance of the Bureau's 8-passenger cars, 2 White trucks, 4 wagons, 7 carromatas, 1 calesa, 4 carretelas, 20 native ponies, and 6 mules, and for the consumption of gasoline, petroleum, grease, oils, lubricants and auto accessories, and for mixed feeds, grass, etc., amounted to ₱22,390.45. Besides the work in the repairs shop, mechanics were often sent to the provinces to inspect and make necessary repairs on the Bureau's tractors and to instruct and train men to operate them.

ANIMAL HUSBANDRY DIVISION

SCOPE OF WORK

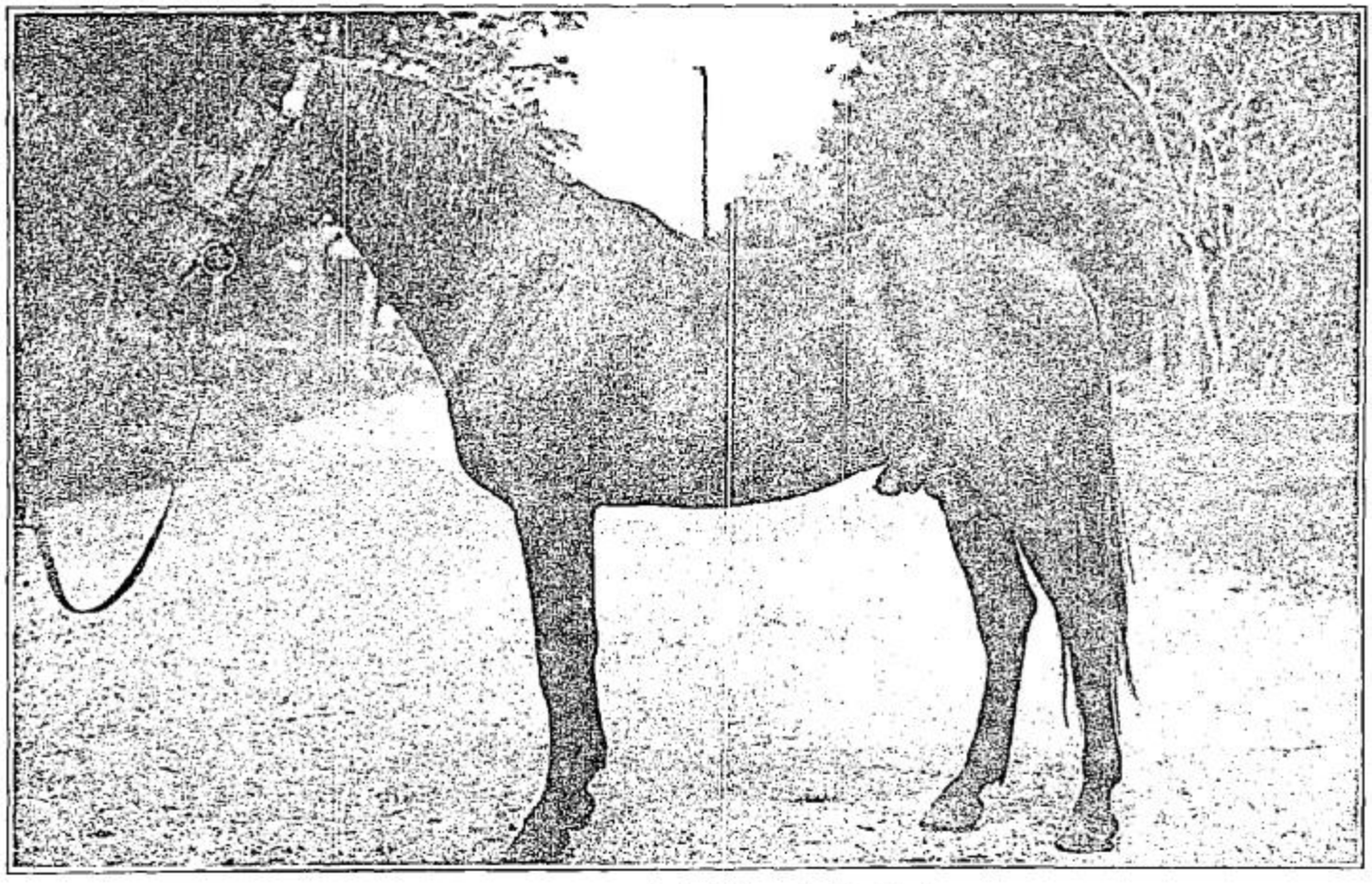
The work in this division has to do with the improvement of the livestock industry in the Islands through the importation of pure bred stock from other countries for breeding purposes, for the establishment of stock farms, public breeding stations, poultry-swine stations and a general upbuilding of the livestock industry. The ever-increasing demand for pure bred stock, especially as regards pigs, chickens, cattle, and goats, is so great that the Bureau is unable to meet it to any great extent. The work of the division throughout the year has been successful and many good breeding animals have been distributed.

ADMINISTRATION

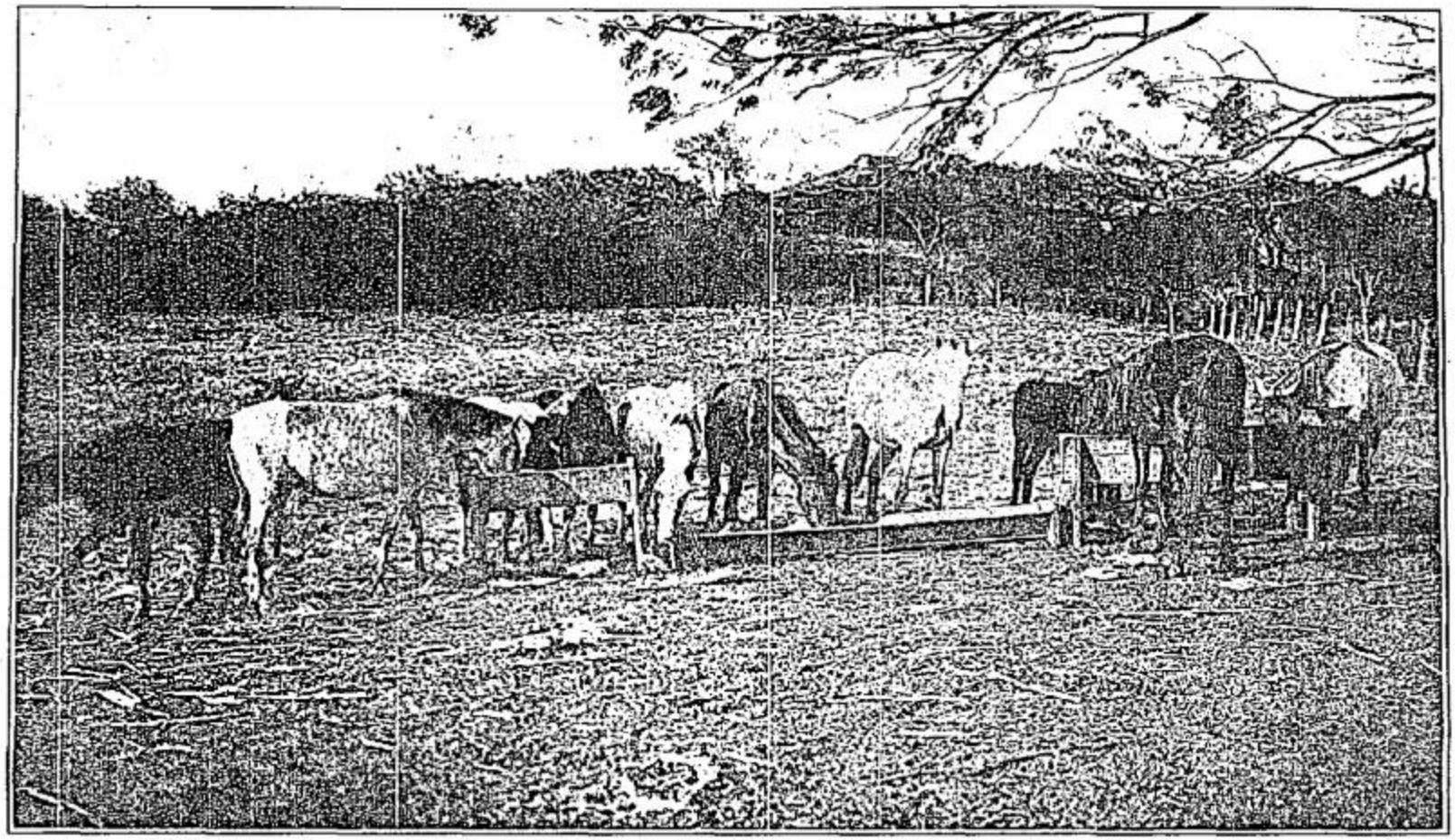
During the year, Dr. Shealy, chief of the division, who returned from an extended leave of absence in the United States, transferred to the University of the Philippines, and Mr. Alfonso Tuason, who served as acting chief of the division was promoted to the position of chief.

On July 10, 1920, an order was placed for 26 Poland-China pigs with Dr. Quinlan of San Francisco. On November 6, 1920, the pigs arrived, only one having died enroute.

Out of the 16 poultry-swine stations maintained at the beginning of the year 13 were transferred to the various municipalities and provinces, leaving only three stations maintained entirely



An American thoroughbred stallion raised in Manila



Pregnant "mestiza" mares bred to stallion on Plate X

by the Bureau. During the year, four out of the 13 stations transferred, finally closed, due to failure in properly maintaining them. The conditions imposed by the Bureau were that the Bureau would supply the original stock, while the offspring would belong to the town or province, same to be sold for breeding purposes only. At present transferred stations are maintained at Bayombong, Nueva Vizcaya; Bilar, Bohol; Cabanatuan, Nueva Ecija; Mexico, Pampanga; San Antonio, Zambales; Santa Barbara, Pangasinan; Palo, Leyte; Amulung, Cagayan; and Vigan, Ilocos Sur. The following stations were closed: Albay, Albay; Laoag, Ilocos Norte; Victoria, Tarlac; and Morong, Rizal. The following stations are still maintained by the Bureau: Balayan, Batangas; Balangue, Naic, Cavite; and Tabugon, Dingle, Iloilo. The newly constructed poultry-swine station at Tiaong, Tayabas is now ready for use and animals will be sent there early during the coming year.

The cattle at Alabang Stock Farm were transferred to the Department of Agriculture and Natural Resources, under Act 2758. The Trinidad Stock Farm was transferred to the Bureau of Education, effective October 1, 1920.

An important work of this division has been the purchase of animals (to be secured within the Philippine Islands) for all branches of the Government, other than the city of Manila, the purchase and sale of Bureau animals and the assistance given to private stockmen in securing improved breeding stock. Very few purchases were made for other branches of the Government, due to the fact that authority to purchase direct without the intervention of the Bureau of Agriculture was granted to several Government offices.

A number of inspection trips to stock farms, public breeding stations and poultry-swine stations were made during the year by both Mr. Alfonso Tuason and Mr. José G. Guevara.

ALABANG STOCK FARM

The farm has been more or less handicapped during the past year on account of shortage of labor. Wages were increased during the first quarter and again on June 1. Repair of the fences of the cattle inclosure is about finished. But little road repair work was accomplished. The laborers' houses destroyed by the typhoon have been repaired.

Horses.—The horses at this station are in good condition. The stallions transferred from the Trinidad stock farm, the three grade stallions from Manila, and the one from Lipa, made quite an addition to the list.

The following is the transaction for the year:

On hand last year	14
Births during the year	2
Received during the year	8
Transferred to other stations	4
Deaths during the year	3
On hand at end of the year	17

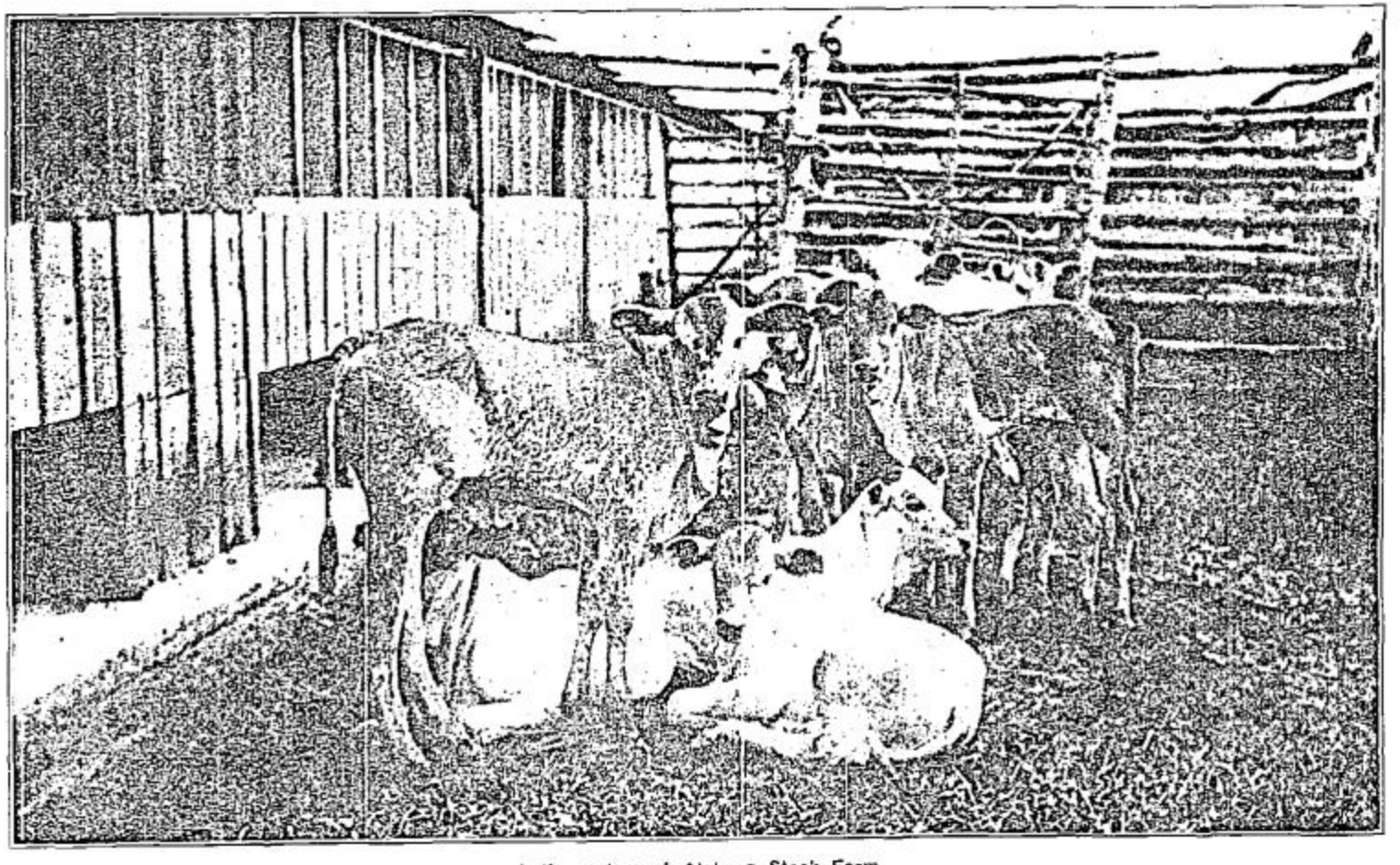
Cattle.—The cattle will have plenty of green
there is now a large field of Para and Guinea grass
There were but 22 head of cattle on hand at the beginning of the year, 17 more were received, 3 calves were born, 6 head were transferred, 2 were sold, leaving 34 head on hand at the close of the year.

Swine.—The swine project is one of the most important of the farm. On November 6, 25 head of Poland-Chinas were added to the herd. Of this breed nothing definite can be said for the present as they have been under observation
short a period. In general, satisfactory results have
obtained with the hogs at Alabang, except for contagious
tion on a shipment of Berkshire hogs received in 1919 from the University of California which caused much trouble during the year. As there seems to be no way to cure this disease, it is recommended that the infected animals be disposed of as soon as possible. There were 251 hogs on hand at the beginning of the year, 245 pigs were born, 29 hogs were received, 202 were sold, 42 were transferred to other stations, 67 died, leaving on hand a total of 214 at the close of the year.

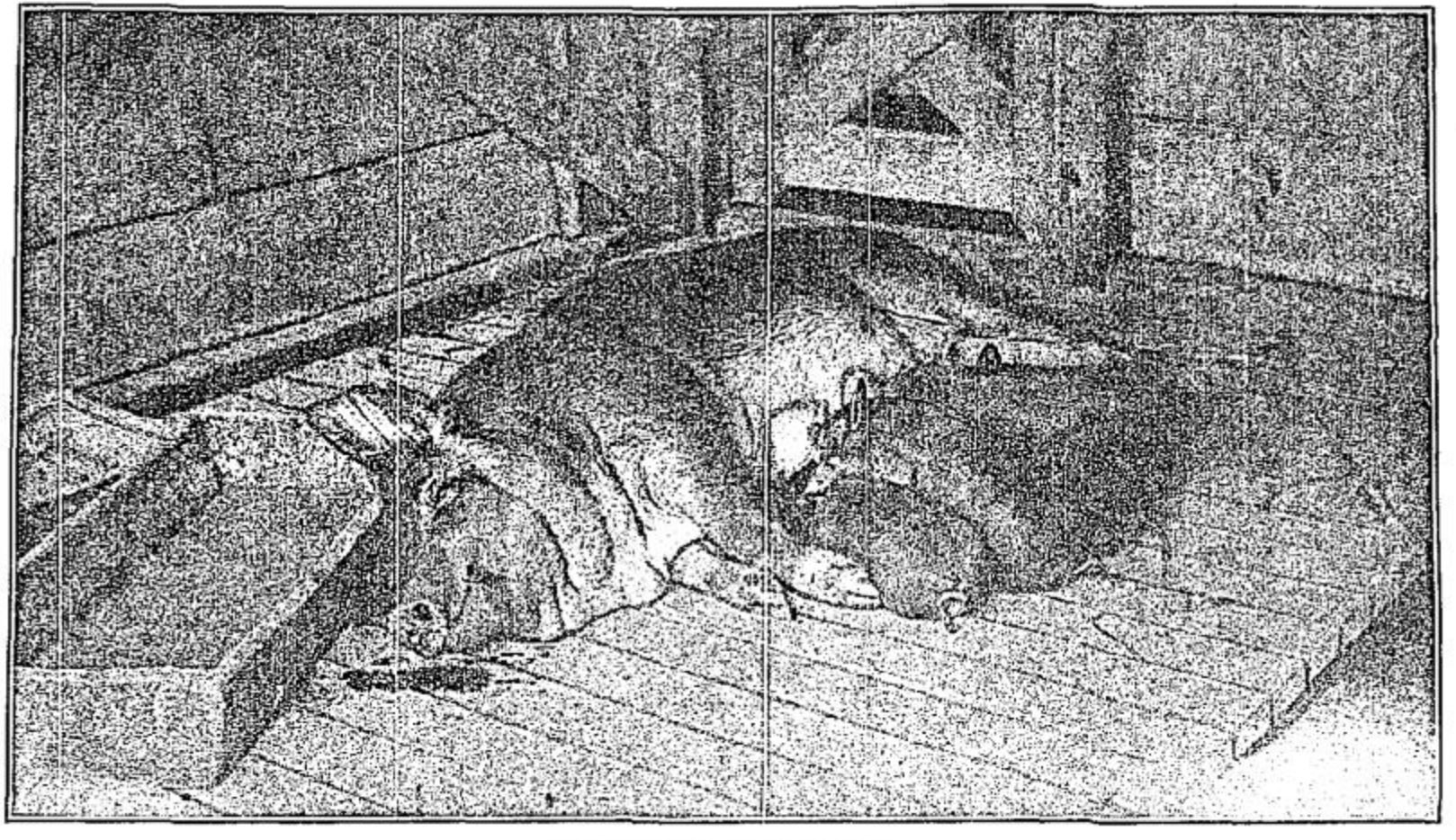
Goats.—There were 63 goats the first of the year, 29 births, 9 deaths, 6 were received, 37 sold, 13 transferred, leaving 39 on hand.

Sheep.—The small herd of sheep at the farm seems to be doing well. There were 7 on hand the first of the year, there were 8 births, 1 death, 9 were received, 5 were sold, leaving 18 on hand.

Poultry.—During the first quarter, new standard breeds of fowls were received from the United States, consisting of Barred Plymouth Rocks, White Plymouth Rocks, Light Brahmas, Buff Orpingtons, Black Orpingtons, Silver Laced Wyandottes, and Brown Leghorns. Many of these birds when received showed symptoms of roup, diarrhea, scaly leg, white comb and chicken pox, and some of them died from these diseases in spite of the care given them. Of the breeds newly received the Silver Laced Wyandottes proved the most delicate to raise. When the chicks are about two months old they are easily attacked by diseases. The Brown Leghorns are much the same as the White Leghorns. They are thriving well and laying a fair number of large eggs.



Indian calves at Alabang Stock Farm



A Duroc-Jersey sow with her litter

The Light Brahmas and Buff Orpingtons thrive about as well as the Rhode Islands Reds. They have not proven as good layers as the Leghorns. The White Plymouth Rocks and the Barred Plymouth Rocks both appear to thrive in this country. There were 655 chickens at the beginning of the year, and 317 were received. There were 163 fowls raised to maturity, 3,679 chickens were hatched, 950 chickens were sold, 226 mature chickens died, 126 were transferred, 16,907 eggs were sold and there were 696 mature birds on the farm at the end of the year.

LA CARLOTA EXPERIMENT STATION

Horses.—The condition of the horses has been fair during the year. The Australian horse, property number 466 has been affected with skin disease but has fully recovered. The death of the stallion El Chico, so much admired by the public, leaves the station with but one stallion for breeding, besides the Australian horse.

Indian Cattle.—At the beginning of the year there were 85 head of Indian cattle at this station. They are sturdy and thrive, are easily acclimated and have been in good condition throughout the year. There were 20 births, 15 were sold and 2 died during the year, leaving 88 on hand.

Chinese and Grade Cattle.—There were 206 head of Chinese cattle and grades at the beginning of the year. During the year 67 calves were born, 22 head were sold and 45 died, and 1 was transferred, leaving 205 head on hand.

Bullocks.—There were 43 head of bullocks the first of the year and but one death during the year and one addition, leaving no change in the number at the close of the year.

Carabaos.—There were 48 head of carabaos at the beginning of the year. During the year 13 calves were born, 10 died and 2 were transferred, leaving a total of 49 at the station.

Sheep and Goats.—At the beginning of the year there were 25 sheep and 12 goats. These animals did not thrive well during the year, due to lack of good housing and intestinal parasites. For the year, 14 sheep were born, 6 were sold and 10 died. Of the goats 6 were born, 6 died and 1 was sold. The year ended with 23 sheep and 11 goats.

Swine.—At the beginning of the year there were 9 Berkshire pigs at the station. They are greatly admired by the public. During the year 5 pigs were born, 4 were sold, 4 died and 1 was received from Manila, leaving 7 on hand.

Poultry.—There were 65 fowls at the station the first of the year. These birds have adapted themselves to their environment and are thriving. A total of 3,235 eggs were laid during

the year, of which 966 were sold, 559 were incubated, 40 on hand and the rest discarded. The year ended with 80 fowls at the station.

TRINIDAD STOCK FARM

This station with all its animals, including superior strains of Angus, Galloway and Indian cattle, and all equipment was transferred to the Bureau of Education, effective October 1, 1920, by Executive Order No. 40.

PUBLIC BREEDING STATIONS

In general, very satisfactory results were obtained from the public breeding stations throughout the Archipelago. The purpose of this project is the upgrading of native livestock by offering free to the public the services of the imported and improved sires maintained at stations conveniently located in the provinces. During the past year these stations were maintained in the provinces of Batangas, Cebu, Rizal, Occidental Negros, Cagayan, Mindoro, Mountain Province, Oriental Negros, Capiz, and Nueva Vizcaya.

FEEDS AND FEEDING

As usual, the different stock farms and breeding stations have raised their own forage and green feed. At Alabang Stock Farm, mixed feed was manufactured and furnished to other stations to the extent of 62,303 kilos during the year.

VETERINARY DIVISION

STANTON YOUNGBERG, D. V. M., *Chief Veterinarian*

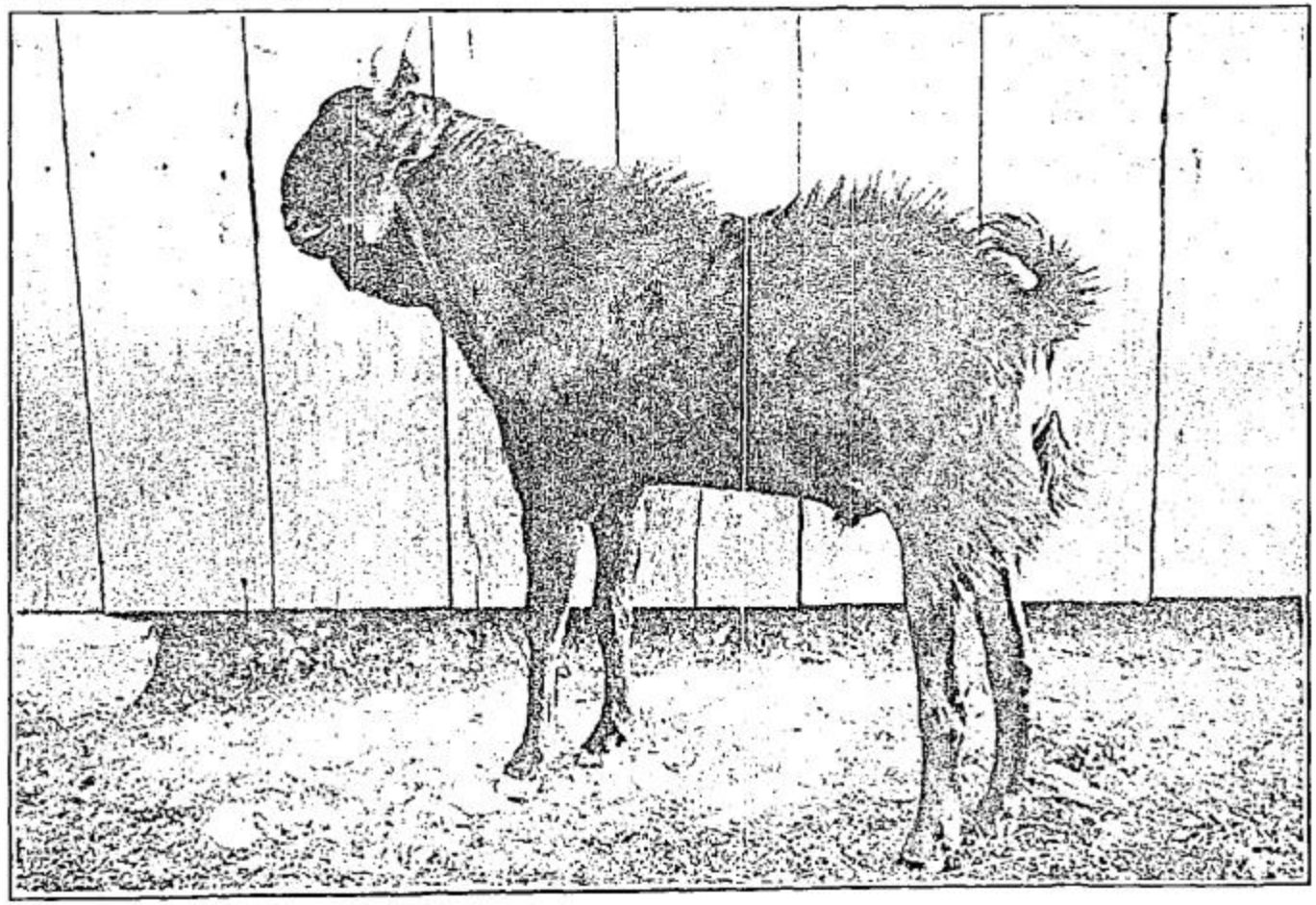
PERSONNEL

On December 31, 1919, the force consisted of 29 veterinarians (of whom 22 were Filipinos and 7 Americans), 5 American livestock inspectors, 156 Filipino inspectors, 1 American clerk and 3 Filipino clerks.

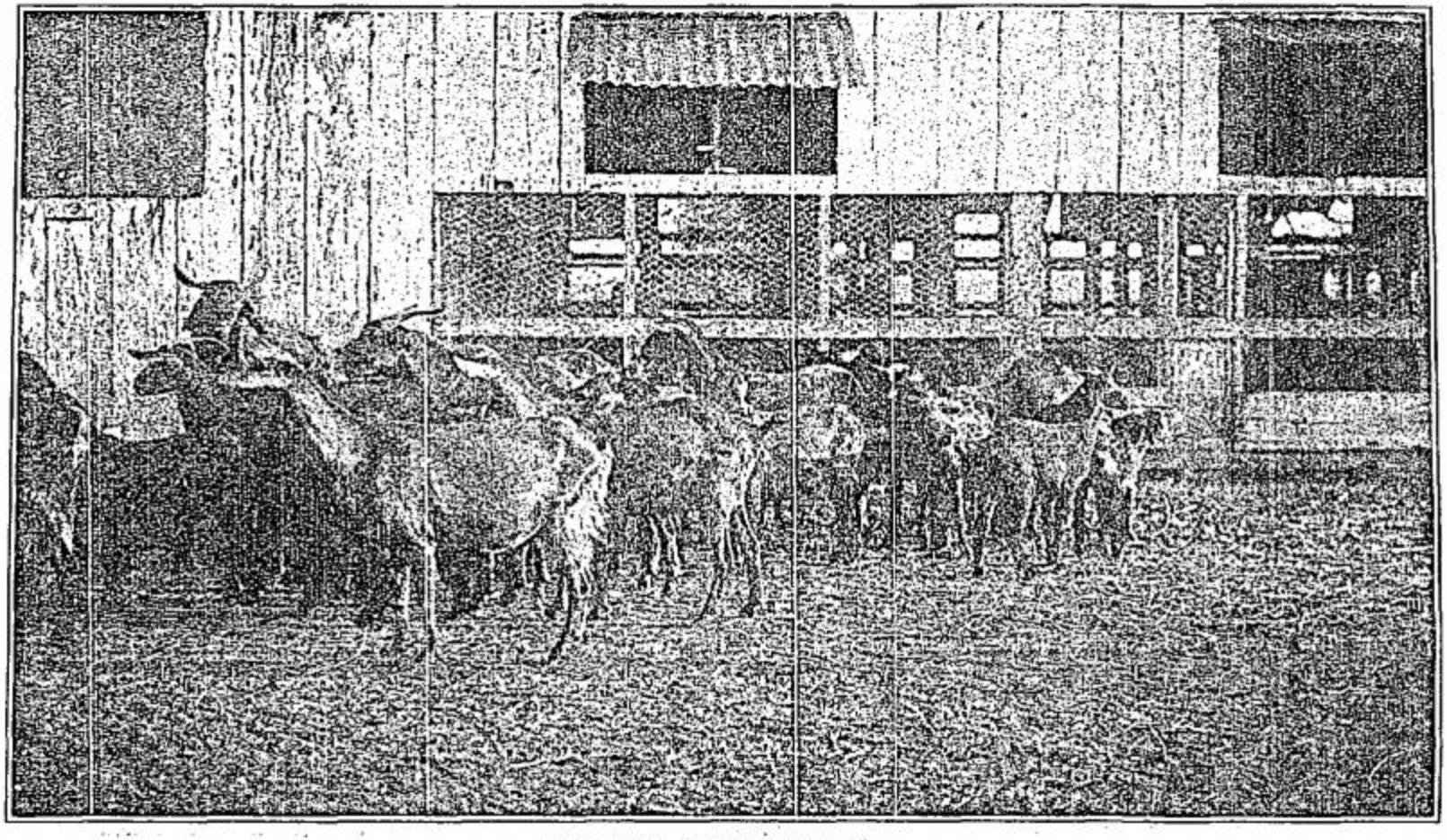
On December 31, 1920, there were in the rolls 31 veterinarians (of whom 25 were Filipinos and 6 Americans), 3 American livestock inspectors, 230 Filipino inspectors, 1 American clerk and 3 Filipino clerks. This constitutes an increase of 3 Filipino veterinarians and 74 Filipino livestock inspectors and a decrease of 1 American veterinarian and 2 American inspectors.

ADMINISTRATION

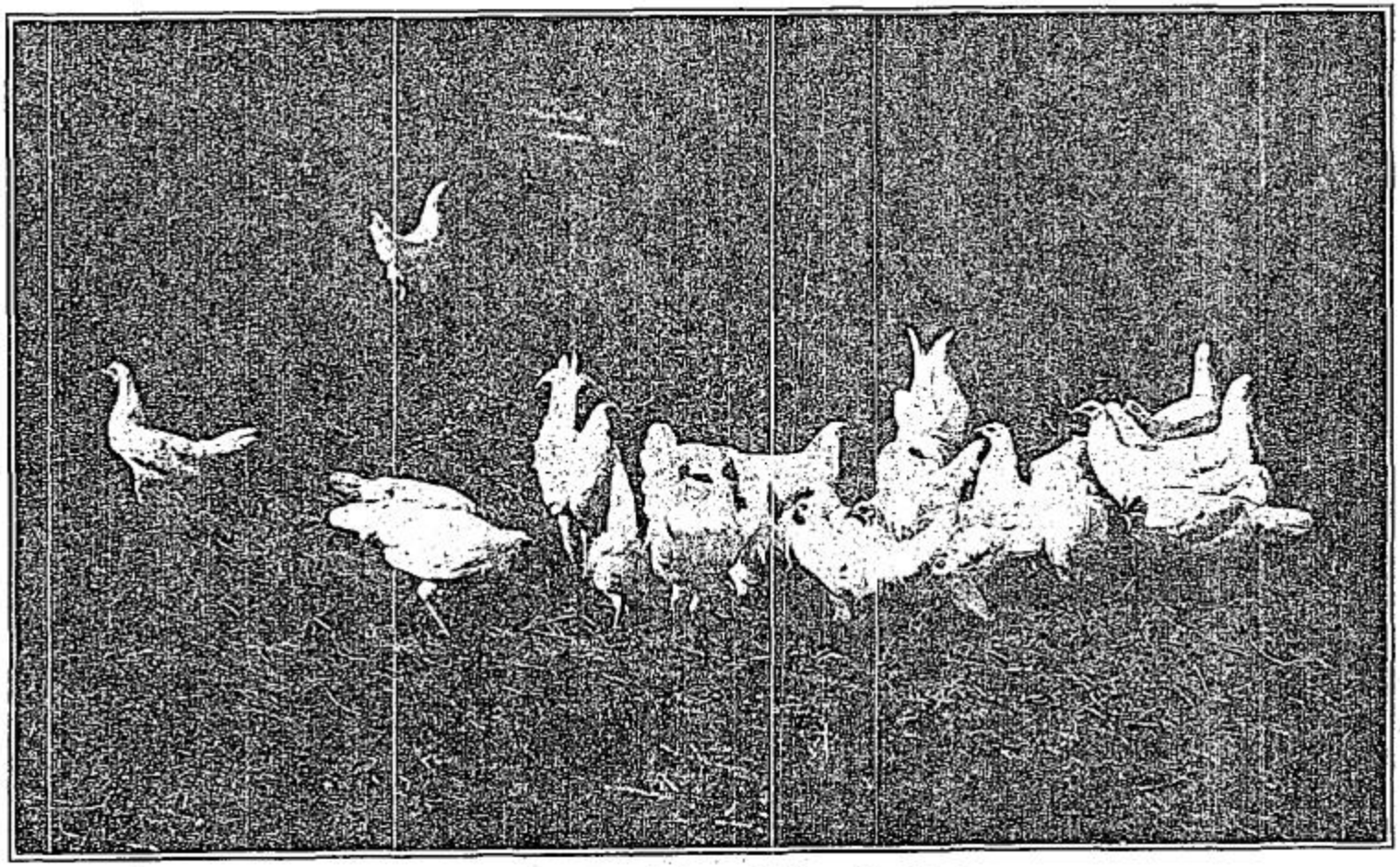
Importation from Foreign Ports.—The vast majority of the cattle arriving at Manila from foreign ports consisted of cattle for slaughter coming from French Indo-China and Hongkong with smaller numbers of carabaos for work purposes from Indo-



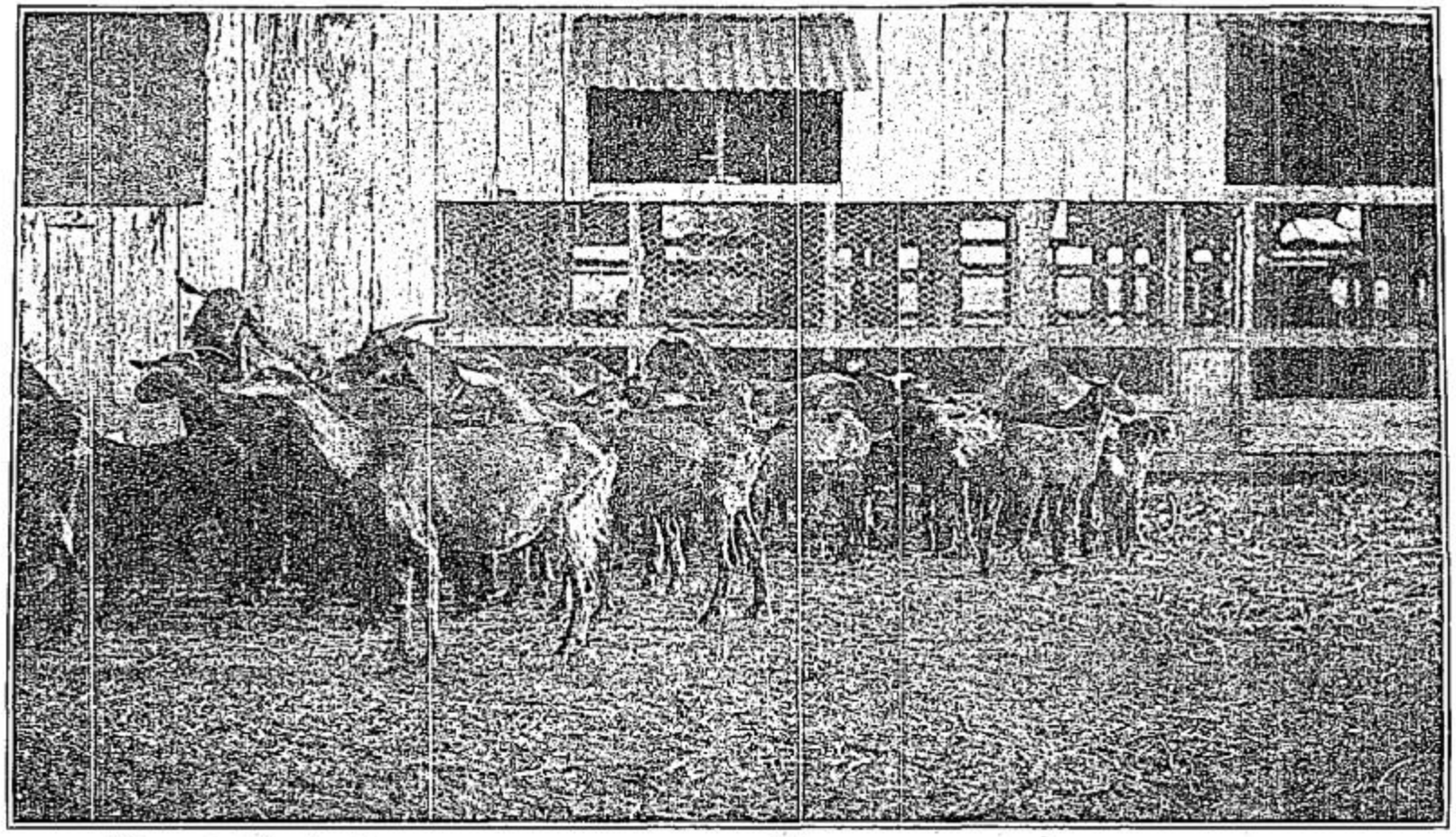
An Indian Billy Goat



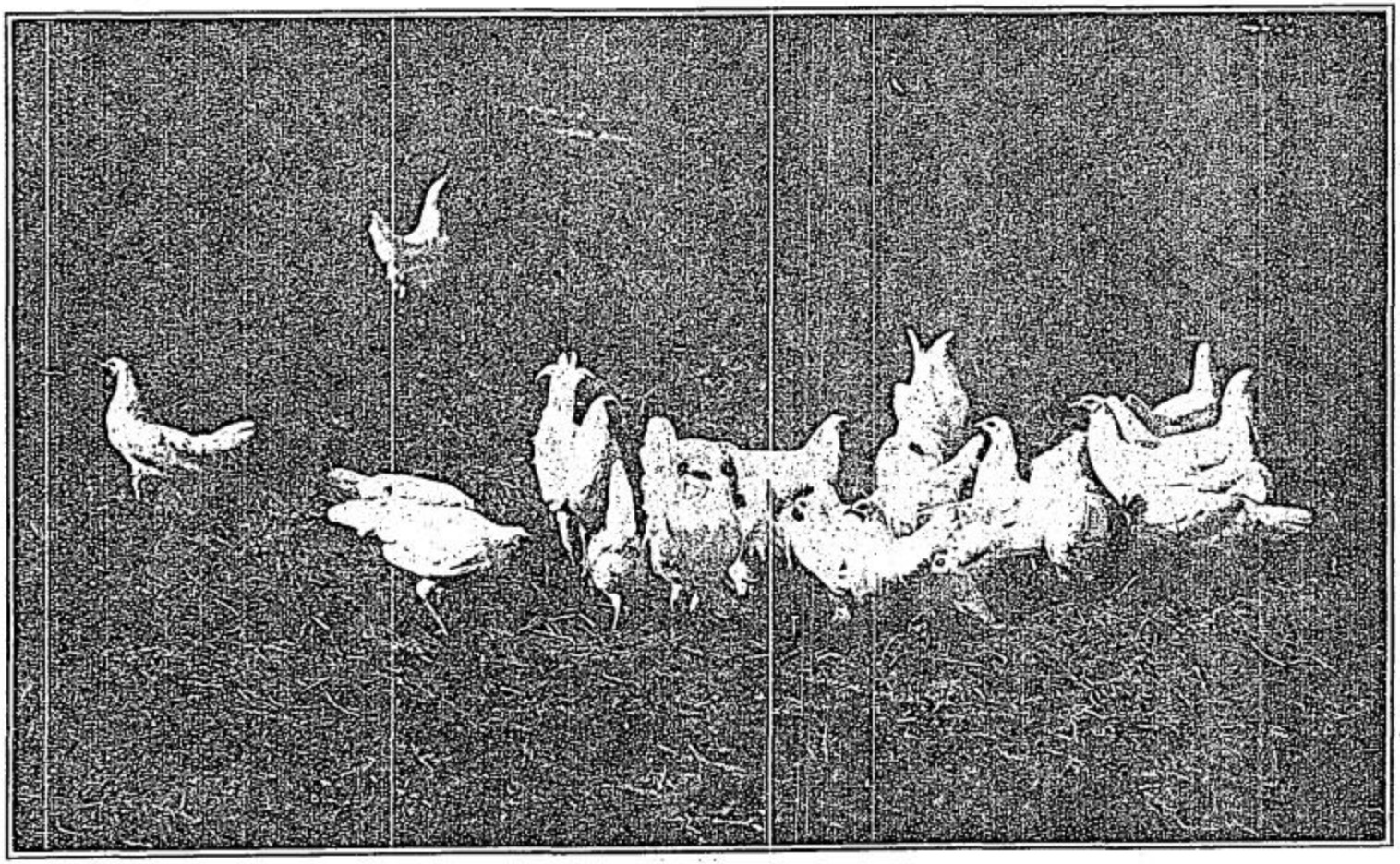
Milch Goats—Spanish-Maltese-Indian



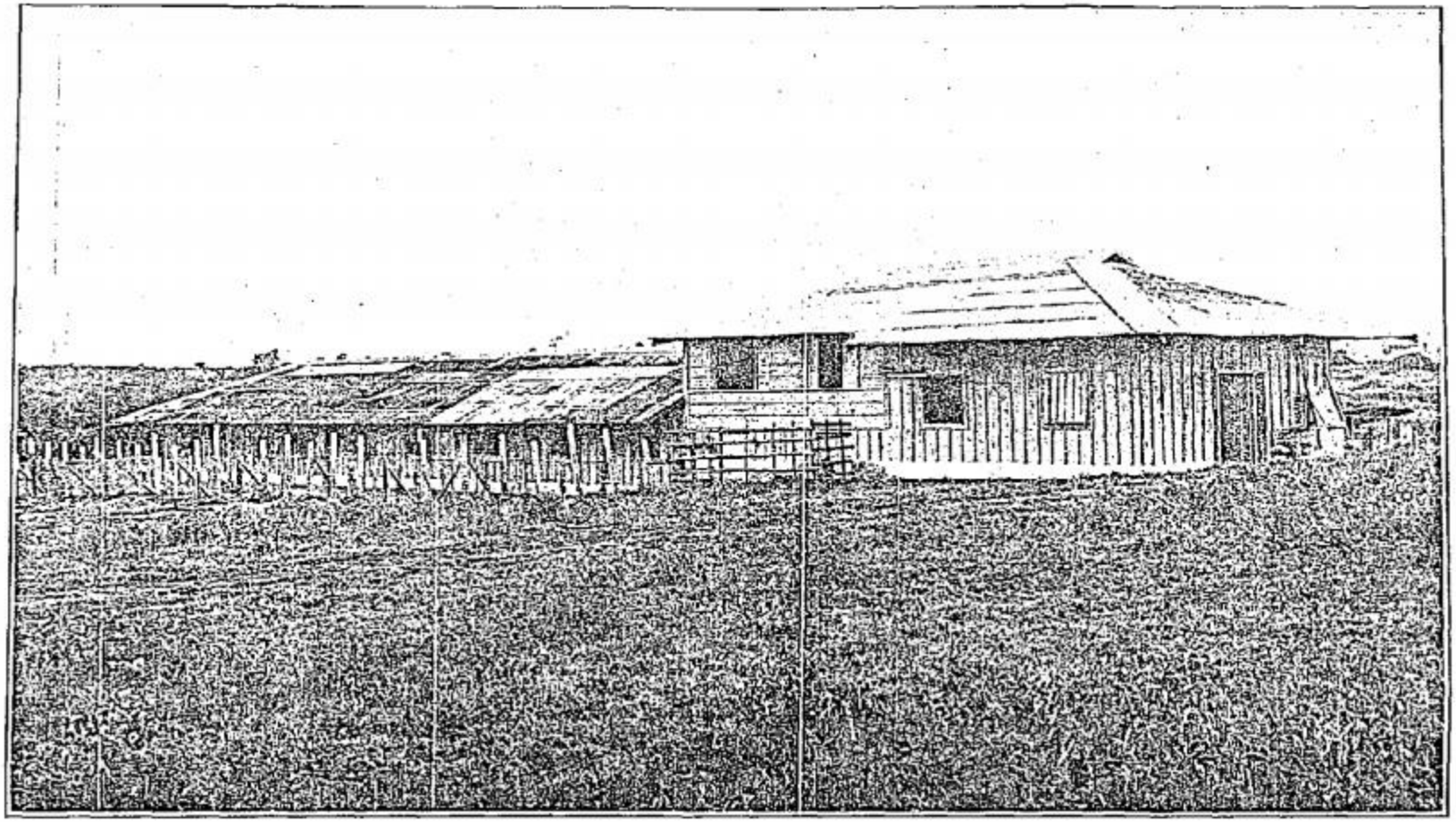
Single-combed White Leghorns at Alabang Stock Farm



Milch Goats,—Spanish-Maltese-Indian



Single-combed White Leghorns at Alabang Stock Farm



Incubator and Brooder House Alabang Stock Farm

China. For breeding and dairy purposes there were imported 124 cattle from California, 117 from India, 42 from Australia and 3 from Spain.

Inter-island Shipment.—Only 11,350 cattle arrived at Manila from inter-island ports, a decided decrease from the arrivals of 1919 of 15,063. There were 2,448 carabaos received in 1920 as compared with 1,753 for 1919.

Inspection for which fees were charged.—During the year 161,863 animals of all kinds were inspected on arrival at the city of Manila, for which fees amounting to P22,241.40 were charged and collected. Of these animals 123,438 were hogs.

Post-mortem Inspections in Manila Matadero.—There were 122,404 animals of all kinds inspected at the Manila Matadero during the year, 1,356 being condemned and 121,048 passed for food.

(1) There were slaughtered during the year at the Manila Matadero 10,473 head of native cattle. Of these 2,704 were females, which is 25.81% of the total of all native cattle slaughtered. Of these females slaughtered 30.65% were pregnant.

(2) *Post-mortem Inspections in Pandacan Matadero.*—During the year 14,640 cattle and 8 carabaos were slaughtered and inspected at this Matadero. Only 4 entire carcasses were condemned, 14,636 being passed as fit for food. However, 39,404 parts were condemned. The animals slaughtered at this Matadero are those imported from foreign countries, particularly French Indo-China and Hongkong.

COMBATING OF ANIMAL DISEASES

Rinderpest.—During the year 22,442 new cases of this disease and 16,911 deaths were recorded. This indicates a decided increase over the figures of last year, which were 16,228 new cases and 11,085 deaths. However, it does not necessarily mean that rinderpest is worse this year, for this increase is largely due to the more complete reports received from our field force which has been one and one-half times larger than the personnel for 1919.

The following table shows the number of rinderpest cases and deaths by three months periods during 1920.

	New cases	Deaths
First quarter	3,847	2,713
Second quarter	4,377	3,056
Third quarter	5,661	4,190
Fourth quarter	8,557	6,952
Total	22,442	16,911

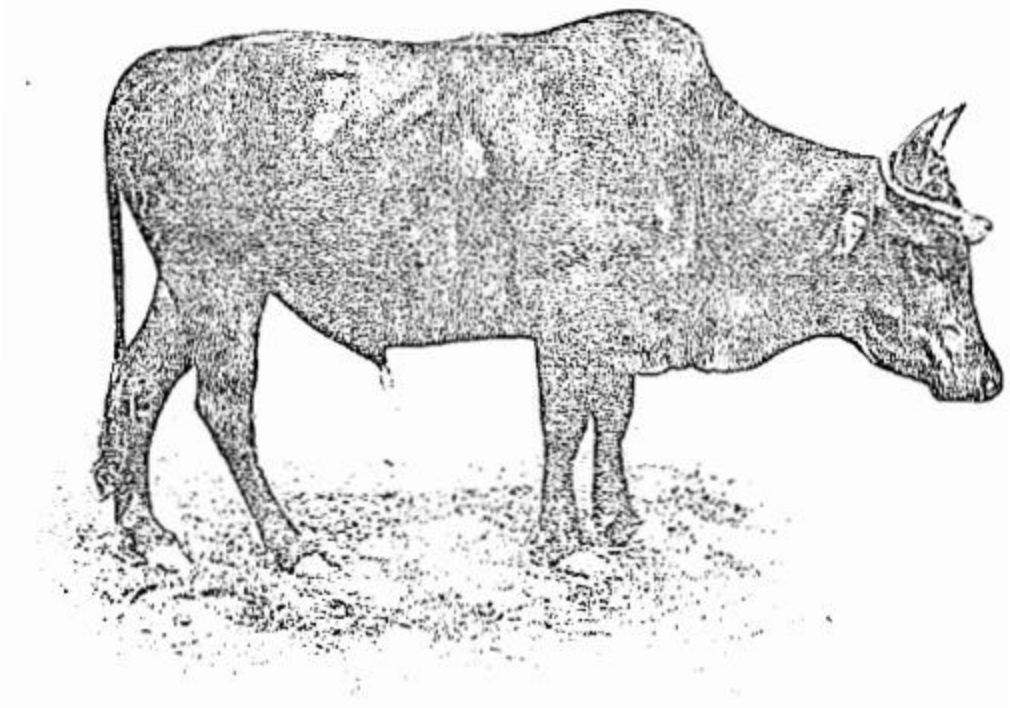
The number of new outbreaks reported during the year, that is, number of instances in which municipalities have been taken up on our records as infected or reinfected, is 373, which is 87 more than outbreaks reported during 1919.

Anti-rinderpest Serum.—The use of anti-rinderpest serum in the field been continued in those localities where livestock owners can afford to pay for the serum. This work has given better results than the previous year, because of the method followed, which consisted in inoculating only among animals where cases have appeared, thus insuring the exposure of the animals to the disease after having received large doses of serum, and before this could be eliminated from the body of the animals, which has been determined to range from ten to fifteen days. The doses used were from 100 c. c. for calves to 300 c. c. for large animals. These doses may be reduced somewhat in case of outbreaks of low virulence. However, no fixed rule can be given for this as it depends upon the judgment of the veterinarian.

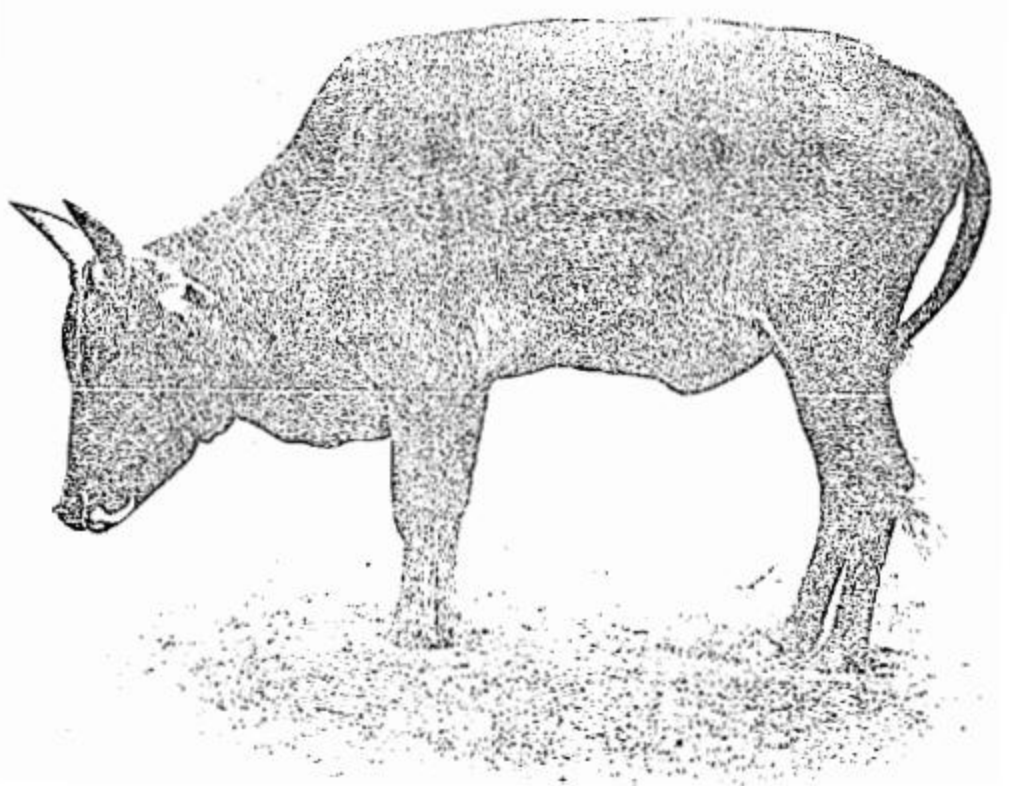
The total amount of anti-rinderpest serum used during the year has been 5,444 liters.

There have been during the year eight requests from provincial governors for the permanent assignment of a veterinarian in their respective provinces. These requests could not be complied with owing to the fact that there are not enough veterinarians even to attend to the most infected localities. The lack of sufficient veterinarians is being felt more acutely from year to year, and is the main reason why the coöperation of livestock owners cannot be secured as they become discouraged because of the want of a technical adviser. No immediate solution of this difficulty is in sight unless the employment of American veterinarians from the States is resorted to again. The College of Veterinary Science, University of the Philippines, has graduated many veterinarians who have done well in this Division, but since the transfer of that school to Los Baños the enrollment has fallen to a great extent and we doubt whether or not it will be able to keep up the number of graduates it put out yearly during the last three or four years.

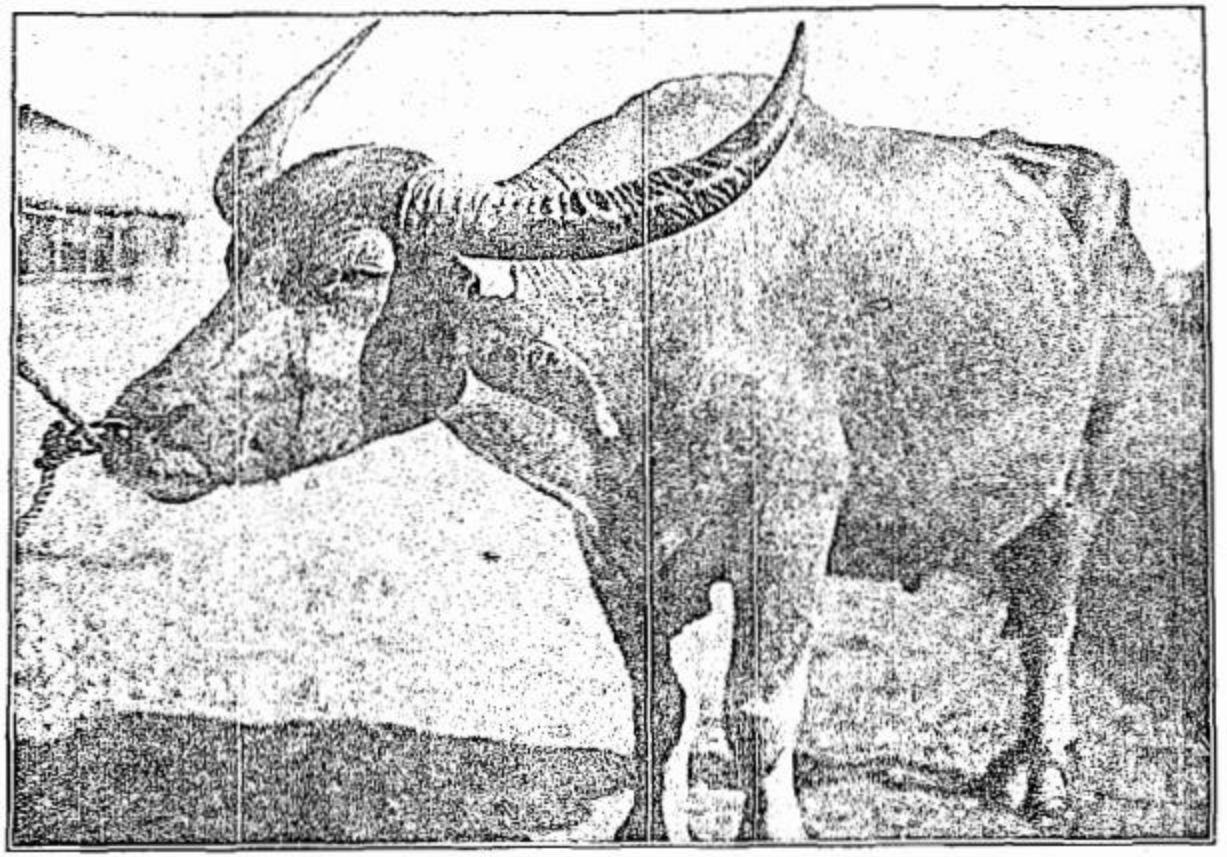
The lack of veterinarians is not being compensated for at all by the legislation passed some eight years ago by the legislature wherein the direction of the quarantine and the responsibility for same was turned over the provincial governors. With a few exceptions provincial governors and their representatives in the municipalities—the town presidents—are not taking the initiative that they should in combating rinderpest and other animal diseases. No efforts whatever seem to be



(*a*) Batanes bull, third day of temperature—shows drooping head, lopping ears, congestion of veins of face, and general depressed appearance



(*b*) Batanes bull in the latter stages of rinderpest—shows general depressed appearance, drooping head, lopping ears, arched back, eyes sensitive to light, staring coat, emaciation



Carabao infected with rinderpest

put forth by these officials to study the rules and regulations prescribed by the Director of Agriculture for the handling of dangerous contagious animal diseases which they are expected to enforce as is clearly and distinctly provided by law. They appear to leave it all to the Bureau of Agriculture, and only show some activity where political motives compel them to take action either through the fear of the governor, if he is of the opposite party, or if actuated by some selfish purpose to inflict punishment to political opponents.

Another clear indication that interest in the work for the suppression of animal diseases is, to say the least, lukewarm, is the glaring fact that ever since the passage of the amendment to the quarantine law, referred to above, not a single municipality, not even a single provincial board, has made a regular yearly appropriation to take care of the animal disease control work in their respective municipalities and provinces, which, mainly through their efforts, the Central Government has seen fit to turn over to them.

Immunization.—During the past year immunizing operations have been carried on at Angeles, Pampanga; Lipa, Batangas; Iloilo, Iloilo and Pandacan Quarantine Station, Manila. A total of 9,865 animals were immunized against rinderpest by simultaneous inoculation. Deaths from all causes during the immunizing period amounted to 220 or a mortality of 2.2%. In addition to the above 5,082 cattle were immunized for serum purposes at the serum laboratory at Pandacan Quarantine Station. The total amount of anti-rinderpest serum produced was 5,444 liters.

Each of the immunizing stations now regularly shows a deficit. The prices of animals have gone up more than 100% in the past three years, and the insurance fee of three pesos per head is not sufficient to cover the losses. If it is not deemed expedient to amend Act No. 2548 to raise the fee to five pesos then the Government will have to be prepared to meet the deficits that occur at the various stations.

The benefits to be derived from immunization of cattle and carabaos are nicely demonstrated by the Province of Pampanga where this work has been vigorously pushed by Governor Ventura since 1915. Previous to this time, Pampanga had always been a hot-bed of rinderpest, and the losses each year were very heavy. In those districts of the province where a large percentage of the animals have been immunized rinderpest is no longer a serious factor. Immunizing operations have not been carried on in the municipalities of Arayat and Candaba, the only two towns which are now heavily infected with rinderpest.

Anthrax.—During the year no serious outbreak of this disease has come to the attention of the officers. Sporadic cases continue to occur from time to time in the regions where it has for so long been enzoötic, notably along the shores of Laguna de Bay and in certain sections of Northern Mindanao.

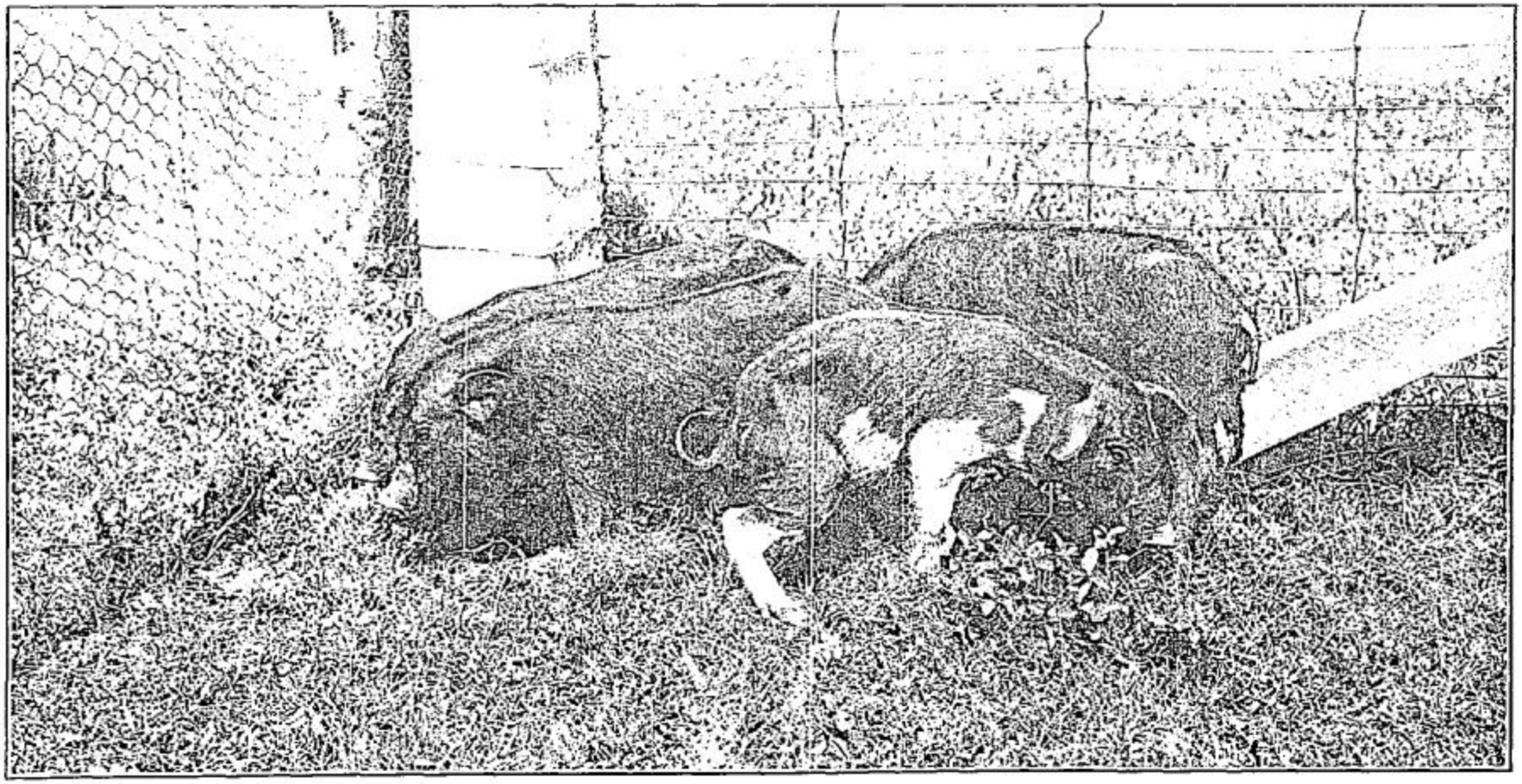
Hemorrhagic Septicaemia.—This disease is more widespread in these Islands than was previously thought to be the case; in fact it is doubtful if there is any province that is absolutely free from it. It usually makes its appearance at the beginning of the rainy season. On account of its rapid course medical treatment is out of the question. Prevention consists in the removal of the well animals from the infected pastures and keeping them away until the later, heavier rains have commenced. A preventive vaccine is being used in the United States which from all reports appears to be giving very satisfactory results. Compared with rinderpest the losses caused by this disease have not been heavy.

Contagious Pleuro-pneumonia.—During the year no cases of this disease have been found either among native or imported animals. The quarantine order issued some years since by the Honorable, the Secretary of Public Instruction, placing the barrio of Sisiman in quarantine to prevent the possibility of this being conveyed from Australian animals imported for slaughter to other points in the Philippine Islands, is still in effect.

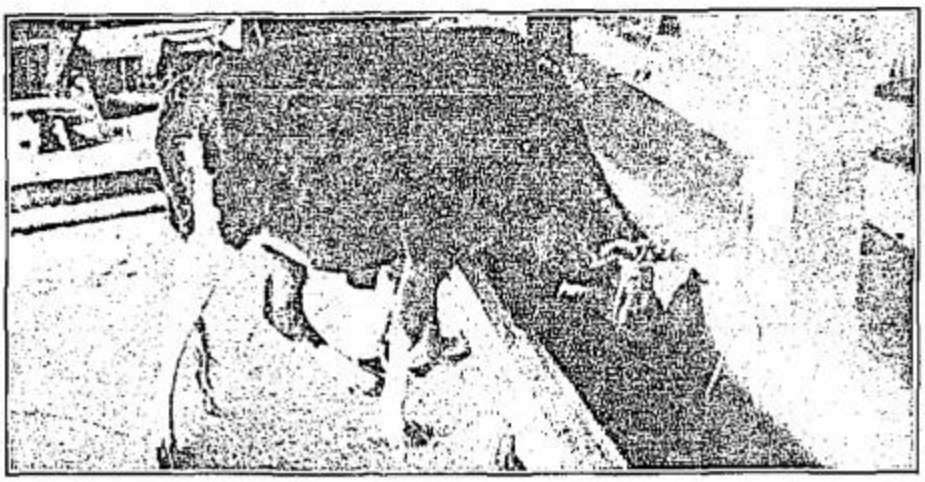
Surra.—The heavy demands of the rinderpest campaign upon the personnel of the Division have again rendered it impracticable to wage any systematic campaign against surra. The disease is known to be widely disseminated in the Islands and numerous reports of the death of animals from this cause have been received by this office. Experimental work has been conducted at the Veterinary Research Laboratory on the perfection of a cure for this disease, but with no much success as far as the horse is concerned.

Glanders.—During the year some cases of glanders among horses were found in the city of Manila and Iloilo, which were ordered destroyed. As this disease is readily communicated to man, and invariably with fatal result, a thorough campaign should be undertaken to eradicate it from the city. This, however, is impracticable until adequate personnel is available. It must be noted, in this connection, that no cure for glanders is known and the destruction of the infected horses, often much against the will of the owners, is the only practicable course.

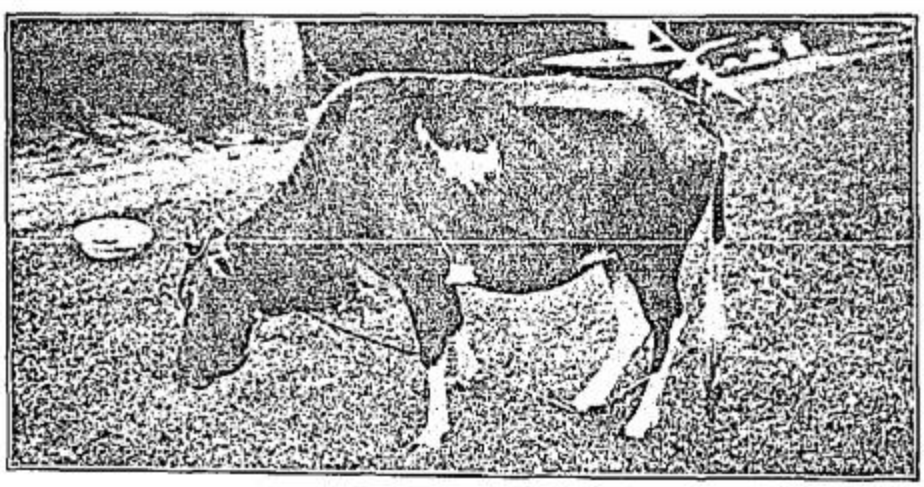
Hog Cholera.—Outbreaks of this disease have been reported in various parts of the Islands during the past year, especially in the provinces near Manila. We have not, however, been able to



A group of pigs sick with rinderpest



(*a*) A cow in a semicomatose condition, respiration sonorous, pulse wiry, body covered with flies, legs spread to keep her from falling. Last stages of anaplasmosis



(*b*) A cow just before being slaughtered, body covered with flies, legs spread, œdema under jaw and throat. Animal had a subnormal temperature. Last stages of anaplasmosis

gather accurate statistics as to the number of cases and deaths. Work is being conducted at the Veterinary Research Laboratory on the development of a vaccine for hog cholera.

Contagious Abortion.—This is a disease which causes a heavy annual loss to the cattle industry of America and Europe. Up to the present time it had not been reported in the Philippine Islands. Since the month of October several abortions, which are very suspicious of this disease, have occurred in a Manila dairy. We have sent to the Bureau of Animal Industry at Washington, D. C., for a good strain of *Bacterium abortus* in order that we may be able to arrive at an accurate diagnosis by means of the complement fixation list. In the meantime the herd is being kept under close surveillance. If it proves to be contagious abortion it will mean the slaughter of perhaps the entire herd. In such a case it may be necessary to consider giving financial aid to the owner as the animals are much more valuable than native stock.

We are also suspicious that this disease may be present in some hogs at the Alabang Stock Farm which were imported from the United States about a year ago.

Tuberculosis.—This disease is practically nonexistant among native cattle and carabaos. Its spread among hogs, however, by pure breds imported from the United States is very possible. Several cases have been found in a lot of Berkshires which were brought in last year. We are endeavoring to stamp out the infection at Alabang with the assistance of the Intradermal Tuberculin Test. This test when properly applied is giving us very accurate results.

Foot-and-Mouth Disease.—Two outbreaks of this disease were reported, one in Sorsogon Province and the other in Bukidnon. How the infection was introduced in either of these places cannot be determined. It is believed, however, to have been a recrudescence of previous infections introduced in the past years. No great damage was caused, and both places are reported clean.

Iloilo Quarantine Station.—During the year 8,500 cattle and carabaos arrived at this station from Pnom-Penh, French Indo-China. This station has been greatly improved, the importers having put in concrete floors in their sheds and laid a concrete drainage system. Roadways are being extended and improved.

Sisiman Matadero.—This station which is used exclusively for the slaughter of cattle from Australia, was closed during the entire year owing to the suspension of importations of beaf cattle from that country. Throughout the year Mr. G. J. Wilson has been stationed there to care for the Bureau property located at the station.

San Lazaro Immunizing Station.—The diagnosis of rabies in dogs for the Bureau of Health by the Division has been continued throughout the year. The sheds at this station have been used for the housing of the large number of suspect dogs that have been placed under our care for observation.

VETERINARY RESEARCH LABORATORY

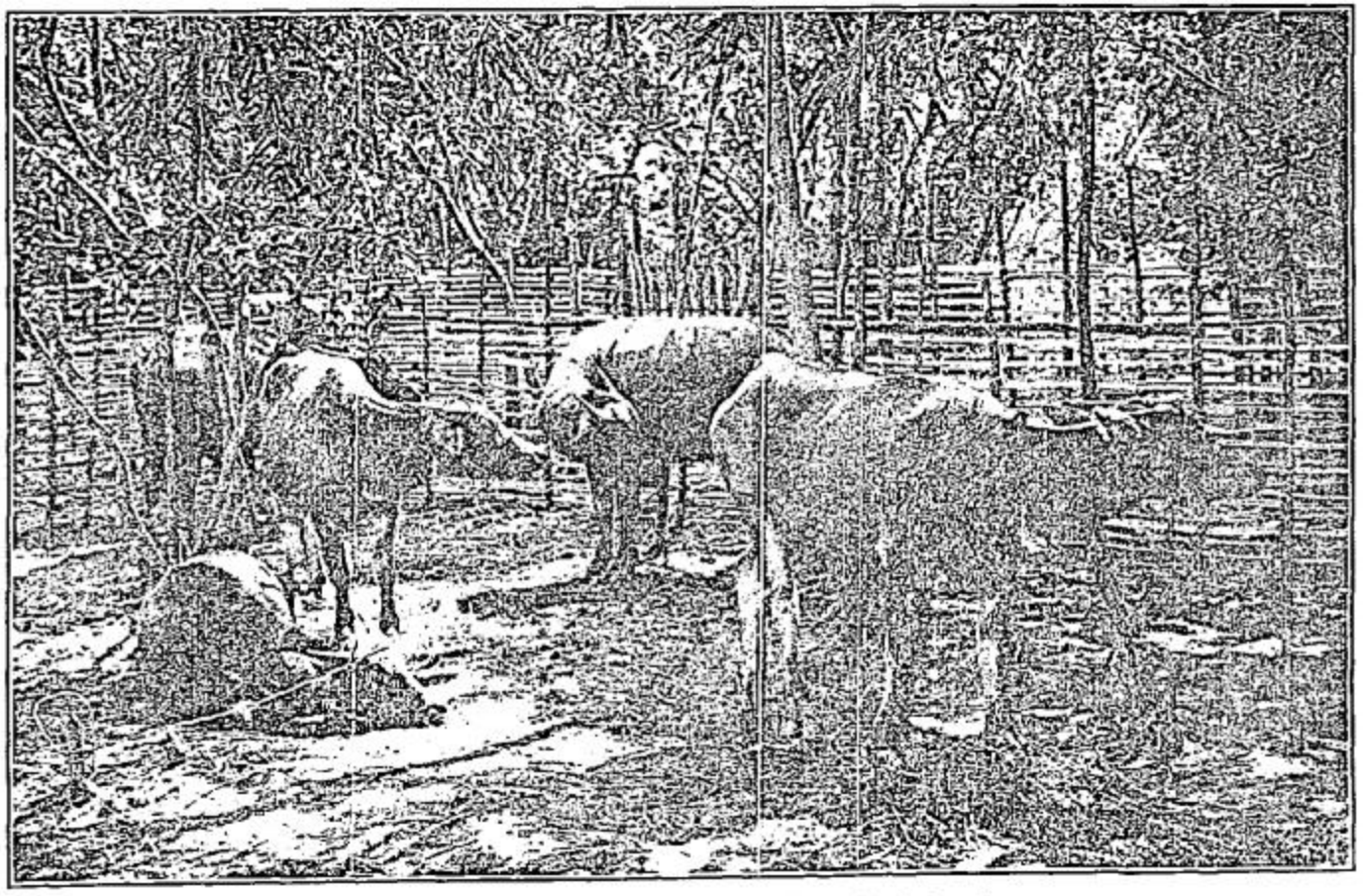
During the past year the principal research work has been devoted to rinderpest.

The rinderpest vaccine that has been worked out at our laboratory is being continually improved and we hope during the coming year to have it practically perfected. At the present time we have developed a vaccine which will give immunity to highly susceptible animals in 10 cubic centimeters doses. We give two injections seven to ten days apart and one week after the last injection, the test animals are exposed to rinderpest by the most heroic methods—given virulent blood subcutaneously and placed in contact with sick animals. In the field we double the dose, giving 20 cubic centimeters at an injection to large work animals. Calves and animals not full grown are given from 8 to 15 cubic centimeters. Each batch of vaccine is tested on a highly susceptible animal before it is sent out, to insure not only its prospective value but also to be sure that it is not virulent and will not produce rinderpest. Some animals imported from the United States have been immunized by the vaccine method. The youngest animal was a Hereford calf which was given its first injection when it was four days old. It never suffered any ill effects from the vaccine and later when given virulent blood did not contract rinderpest.

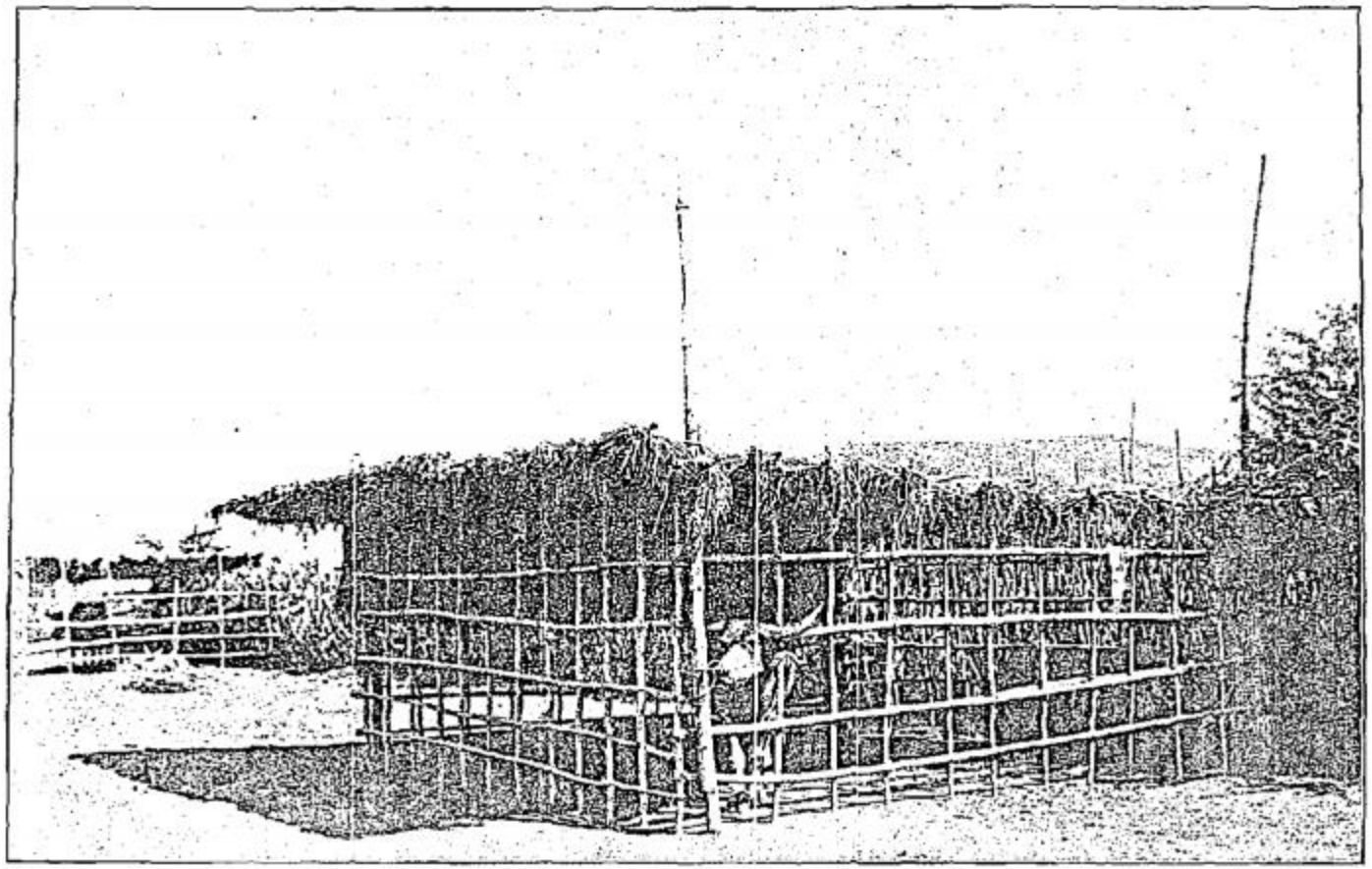
During the past year we have tested out two animals which were vaccinated three years ago and two animals which were vaccinated two years ago. These four animals were given virulent blood. One of them gave a slight temperature reaction which lasted for only two days. The other three animals remained perfectly normal in every respect.

A total of 4,433 animals have been injected with vaccine during the year in the Provinces of Rizal, Batangas, and Bataan. Nearly all of these inoculations were performed in rinderpest infected barrios and contributed to a speedy disappearance of the disease.

Experiments are being carried out in producing the vaccine in a semi-dry form, with results which have been highly gratifying. This semi-dry vaccine is readily placed in suspension when it is desired to be used, and is administered in from 10 to 15 cubic centimeters doses. An order has been placed for a "Shar-



Corral for the isolation of animals infected with rinderpest



Method of isolating individual animals exposed to rinderpest

ples Centrifuge," and we hope in the near future to prepare all the rinderpest vaccine in this manner.

Hog cholera vaccine is being developed along the same lines as the rinderpest vaccine with just as promising results. In vaccinating hogs we mix the rinderpest and hog cholera vaccines, thus immunizing the hogs against both diseases.

Through the courteous assistance of Dr. Schöbl we have had some rinderpest and hog cholera vaccines desiccated and put in a powder form. Further work will have to be done on this before much can be said.

Work on a curative treatment for surra has been continued, but with negative results.

An outbreak of anaplasmosis was diagnosed among cattle undergoing immunization at the station in Lipa, Batangas. The incubation period, symptoms, blood examination, treatment and post-mortem findings were given further study. It appears that carabaos are immune to this disease and the question arises whether they are also immune to Texas Fever. This all leaves much work still to be done with these two diseases.

We have done all the diagnostic work on rabies for the City of Manila during the past year.

We are gradually getting the Research Laboratory equipped in such a manner that accurate work can be done on a large scale. A refrigerator room has been installed and is giving useful service in the keeping of vaccines and serums. The most important addition is a tissue mill designed and made by Prof. Robertson Matthews of Sibley College, Cornell University, Ithaca, N. Y. It was designed especially for our rinderpest vaccine work. Other apparatus installed for this work are a large centrifuge holding 500 c. c. cups, an electric shaking machine, and an electrically heated water bath.

With the assistance of Dr. Schöbl of the Bureau of Science we are immunizing five carabaos against tetanus to ascertain their availability as producers of antitetanic serum. Carabaos are highly susceptible to this disease and we are of the opinion that they will produce a very potent anti-toxin.

RECOMMENDATIONS

In our last annual report it was recommended that the legislature be asked to amend Act No. 2548 so as to increase the immunizing fee from three to five pesos per head. The present fee is not sufficient to cover the losses that occur during immunization owing to the high values of animals that prevail. This recommendation is reiterated.

The funds alloted for carrying the work of immunization will soon be exhausted. Several petitions have been received from Occidental Negros and Iloilo for the establishment of immunizing stations in those provinces. We are not able to accede to those requests as the funds now available will not permit it. The work of the past five years clearly demonstrate the practicability of immunizing at provincial stations and also reveals the great beneficial effects resulting therefrom. It is strongly recommended that the legislature be urged to provide sufficient funds for this work so that the work at present under way can be continued and the new stations requested be established.

For the protection of the cattle raising industry a law should be passed which will prohibit the slaughter of young female cattle which are in good condition and are capable of reproducing.

ACCOUNTING DIVISION

PERSONNEL

Due to the meagerness of the appropriation for the year, out of the 19 positions, there were 12 new appointments and 9 separations. Of the 9 separations, 7 were experienced clerks. All of the incumbents of the most important positions in the Division, such as the Chief of the Bookeeping Section, the Chief of the Auditing Section and the Clerk in charge of the American Colony accounts, resigned during the year. That so many of the experienced personnel in the Division leave the service is due to the small appropriation allowed this division as aforesaid, and to offers of better paid positions elsewhere. It was for this reason that it was impossible for the Chief Accountant to raise the standard of the efficiency of the Accounting Division.

In July 1920, the Cashier was transferred to the Administrative Division, but most of the work connected therewith was done by the clerks of the Accounting Division, until December 31, 1920.

ADMINISTRATION

During the early part of the year, the Chief Accountant devoted most of his time to the closing of the 1919 accounts, guiding and instructing the newly appointed Assistant Chief Accountant, the Bookkeeper and the Clerk in charge of the American Colony accounts, and adjusting the accounts of the Food Campaign, which were transferred to the Bureau of Agriculture in January, 1920, unclosed for December, 1919.

The expenses and income of the Bureau of Agriculture were recorded under different classifications of expenses and income

and functions of each division the same as in 1919. The functional accounts during the year were increased from 111 to 166. The actual cost of each campaign carried by each division, for example, rice work at La Carlota of the Plant Industry Division, or locust extermination of the Plant Pests Control Division, were recorded by classifications of expense such as salaries, wages, traveling expenses, etc.

The Division has observed the delay in submitting the disbursements covering the salaries of field personnel by the municipal and provincial treasurers and of the complaints of the field force advising this office that the treasurers often decline to pay their salaries due to no cash on hand by the treasurer, so from March 1, 1920, this office was compelled to again appoint the Farm Advisers as special disbursing officers to pay the salaries of their subordinates and their own. Other field employees are paid by warrant. The warrants covering salaries of employees are drawn in advance, ready for mail upon receipt of a properly filled out Time Certificate. But if an employee was absent during the month and has not submitted a claim for reimbursement during the month wherein the corresponding amount to cover his absences could be deducted, necessarily the salary warrant is cancelled and another warrant issued.

Another fact which greatly enhanced the difficulties met with by the new and inexperienced clerks of the auditing section of this Division was that traveling expense vouchers and time certificates of our field men were in most cases not well prepared. In many instances the whole vouchers were returned to the corresponding claimants for correction, thus causing delay in reimbursing the amount. As evidence of the truth of this assertion, there were 3,200 memoranda re disallowances sent out during the year.

PROPERTY DIVISION

PERSONNEL

The personnel of this division is composed of a chief, 6 clerks, 2 chauffeurs, and 14 laborers. The work of the Division is divided into 5 sections: Requisitions, Individual Record of Responsibility Station Property other than animals, Station Animals, and Storeroom, Shipping and Receiving.

SCOPE OF WORK.

All acquisitions of property are effected through this division and all transactions on property already acquired are supervised by the same. The records of property are kept in the form of memorandum receipts, invoice-receipts, inventories, and ledger

cards. Four clerks are assigned to attend to requisitions, record of property and transactions thereon, while two clerks with seven laborers are assigned to the storeroom to attend to shipping, issuing and receiving property and supplies, and to miscellaneous storeroom work.

During the year there were handled by this Division 394 requisitions, 406 direct orders, 432 work orders, 380 property notifications, 1,717 shipping memoranda and 14,995 requests for supplies and issue slips.

DIVISION OF PUBLICATIONS

GENERAL STATEMENT

The Division of Publications which for the first time has been under the direction of a Filipino, has considerably progressed as shown by the increase number of subscribers to *The Philippine Agricultural Review*, publications distributed, translations made, printing work done in the mimeograph and multigraph machines, and illustrations printed in the photographic section.

The Philippine Farmer having become a popular farm paper, an endeavor was made to increase its English and Spanish editions into as many pages as the appropriation for printing and binding for this year allowed, so that this monthly publication of 8 pages only, was published in 20 pages in August as the Fifth Farmers' Congress number, and subsequently in 12 pages.


20 PAGES
FARMERS' CONGRESS NUMBER
THE PHILIPPINE FARMER
VOL. VI MANILA, P. I., AUGUST, 1920 No. 8

TRANSLATION

During the year, the translation work amounted to a total of 1,593 pages with an average of 153 pages per month as againts 1,202 pages for 1919, with an average of 100 pages per month. Each manuscript page averages 200 words. This includes *El Agricultor Filipino* and miscellaneous translation orders from the different divisions of the Bureau. *El Agricultor Filipino* in its 12 numbers (January–December) aggregated 777 manu-

script pages as against 581 manuscript pages for last year. Since April, 1920, the division resumed the practice of translating all news items, and this work together with the increase of the page-issue of *El Agricultor Filipino* has augmented the bulk of the translation work.

PRESS ITEMS

Three hundred seventy-nine pages of press items have been distributed. These consisted of crop reports from the different provinces, announcement of trips and changes of stations of field personnel and other miscellaneous subjects.

BULLETINS AND CIRCULARS

Two thousand five hundred copies of Bulletin No. 35 entitled, *The Coconut Palm: Its Culture and Uses,* were ordered printed and delivered. These are now for sale at ₱1 or ₱1.20 post paid per copy.

The following circulars were published during 1920:

Circular No. 104. Raising Ducks.
Circular No. 115. Yam Culture.
Circular No. 116. The Four-Spotted Corn Silk Bettle.
Circular No. 117. Rice Pests.
Circular No. 118. Rice Farming.

Number 95 to 103 and 105 to 114 were given to miscellaneous publications which, in fact are circulars but had no numbers.

Total number of publications distributed.—During the year a total of 45,468 copies of bulletins, circulars, loose copies of *The Philippine Agricultural Review, The Philippine Farmer* (English and Spanish) and miscellaneous publications were distributed, against a total of 8,437 only of last year.

MIMEOGRAPH, PLANOTYPE AND MULTIGRAPH WORK

Mimeograph.—During the year, delivery was made on a total of 662 work orders aggregating 1,134,881 copies as against 814 work orders aggregating 914,115 copies for the previous year.

Planotype.—During the year delivery was made on 80,800 manuscript and card copies.

Multigraph.—The multigraph machine has turned out during the year a total of 453,936 copies as against 216,625 for the previous year.

PHOTOGRAPHIC WORK

Twenty-eight thousand feet of cinematographic films have been developed—a new work added to that of the photographic section. These films are composed of views of La Carlota Experiment Station, Lamao Experiment Station, Alabang Stock

Farm, Alabang Rice Station, Trinidad Stock Farm, and Singalong Experiment Station, showing the different modern methods of farming. To make these films the Bureau of Agriculture had to purchase a projector which cost ₱550.

During the year 1920, a total of 7,136 photographic prints have been made and 1,051 plates and 54 rolls of film have been developed.

LIBRARY

In spite of the lack of experience of the personnel, inasmuch as the acting librarian resigned and a new man had to be detailed to perform his duties, the work in the library has been duly performed. Much has been accomplished in the line of reference work and information on special subjects. Great efforts have been spent in rendering help to technical men of the Bureau and the public in general, but the deficiency of proper books and periodicals needed, makes it hard for the library to lend all required aid.

Books.—During the year 90 bound volumes have been received. Most of these are treatises on special technical subjects and were sent directly to the Bureau officials interested in them. The others are in the library for reference.

Cuts.—There are at present 1,715 cuts in the library. Of these, 110 have been ordered during the year. The work connected with these cuts—filing and keeping them with the needed legends and lending some to certain publications and individuals —was properly carried out.

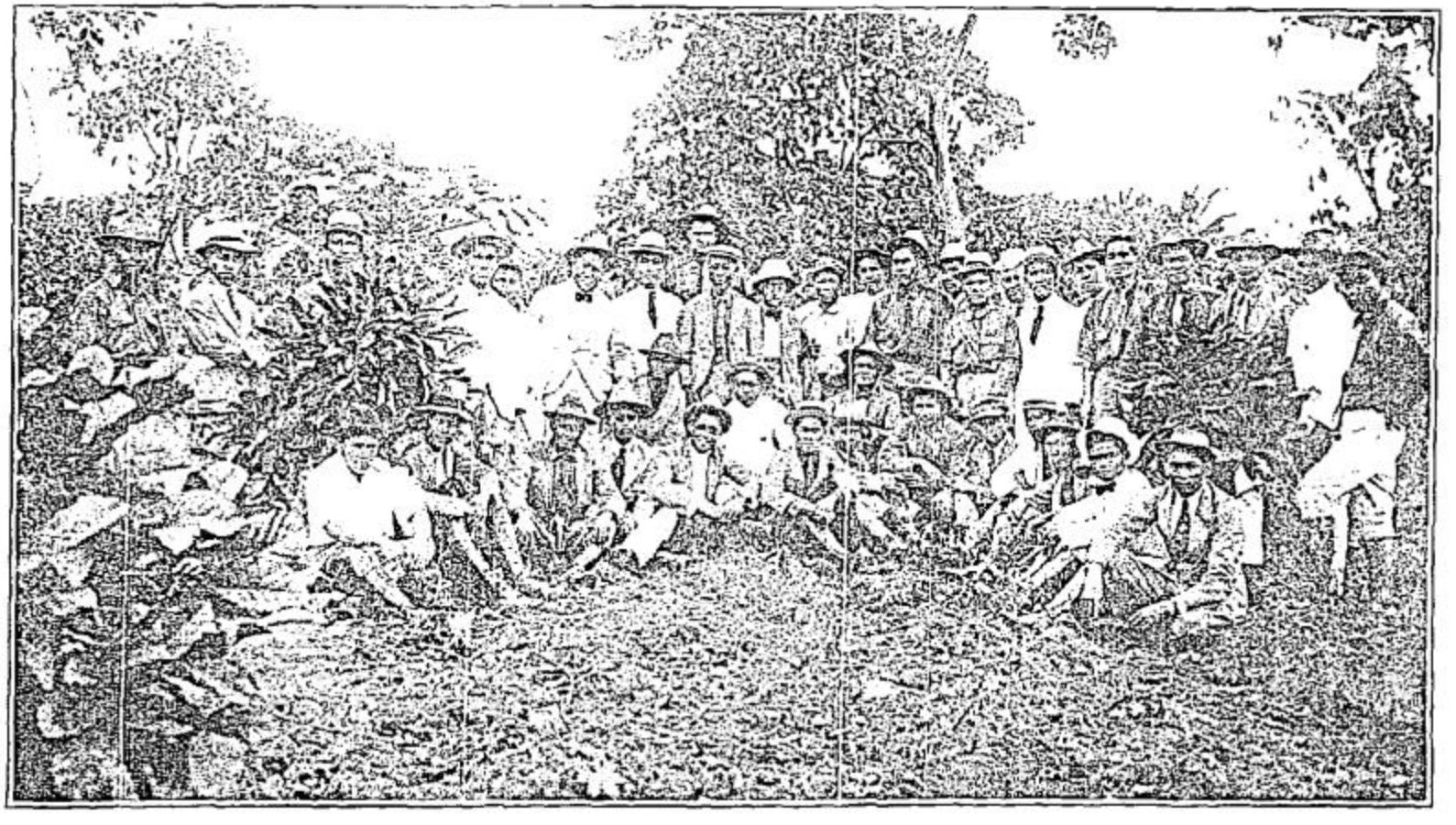
Periodicals.—During the year 460 foreign periodicals and 83 domestic have been handled. Of these 37 are paid for. These periodicals are received regularly and constitute the regular up-to-date reference.

Maps.—There are 166 maps available in the library. These are maps of different Bureau Stations, projects, etc. No new map has been received during the year.

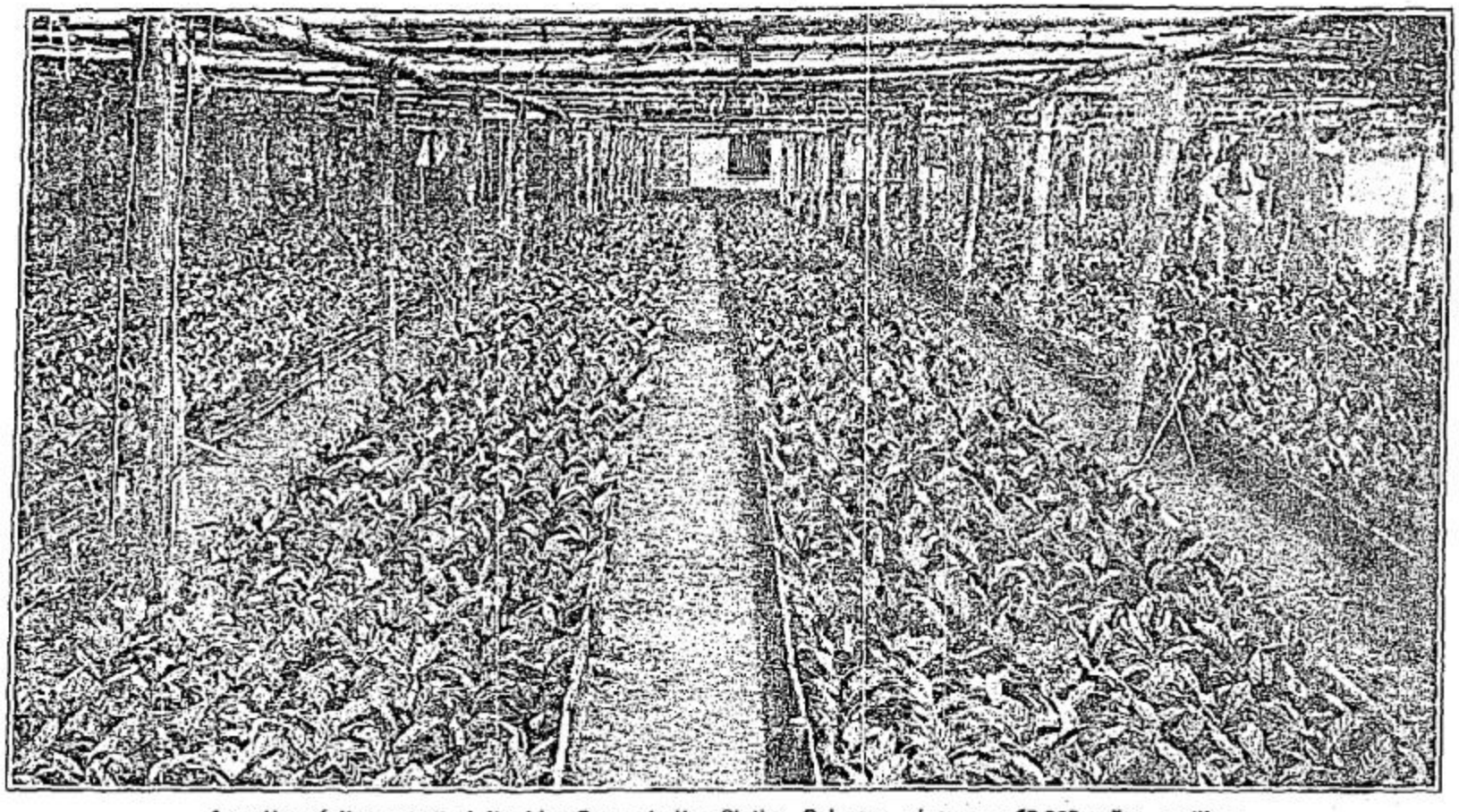
DEMONSTRATION AND EXTENSION DIVISION

PERSONNEL

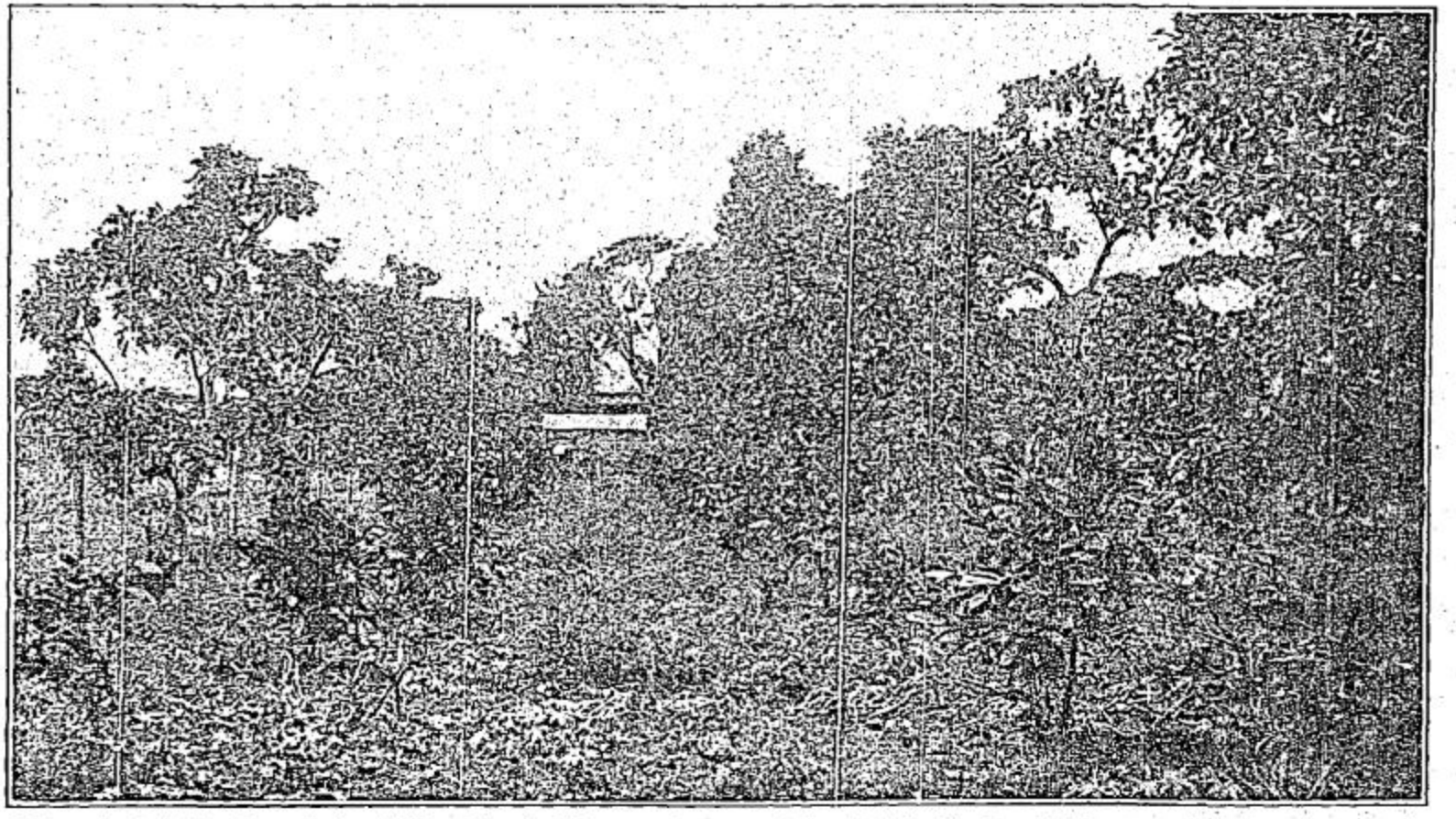
The personnel of the Division in the Central Office consists of one chief and one assistant chief, one farm adviser, one agricultural assistant, one stenographer and one typist. In the field there are 3 supervising agricultural agents, 34 farm advisers and 6 acting farm advisers, 90 agricultural assistants and junior agricultural assistants, 16 emergency junior agricultural assistants and 31 tobacco inspectors. The total number of employees shows an increase of 25 as compared with the year 1919.



The farm advisers on a lecture trip to Lipa Demonstration Station, Batangas. The lecture was given by Agricultural Advisor P. J. Wester at the coffee orchard of the station



A portion of the nursery at the Lipa Demonstration Station, Batangas, where over 60,000 coffee seedlings, besides cacao, citrus, lanzon, blackpepper, etc., are raised



Coffee orchard at Lipa Demonstration Station. The shade trees are Anas, very closly related to Dap-dap. Catch crops such as beans, arrow roots, and other crops are planted between the rows

A plot of Irish potatoes in the demonstration garden at Lacasacan, located on the summit of one of the highest mountains of Bontoc

SCOPE OF WORK

The Demonstration and Extension Division serves as an office through which the Bureau extends its influence and service to the farmers of the Philippines, large and small, but especially the latter, who form by far the greater bulk of the farming population of the Islands. Its function is to demonstrate to the tillers of the soil, and induce them to adopt, improved agricultural practices. Better methods of cultivation, the development and improvement of poultry and swine breeds; coöperation, seed selection, use of better implements, diversification of crops, etc., are subjects emphasized to them by the farm advisers and agricultural assistants, who are the executors in the field of plans designed to promote the adoption of such practices as are essential for the betterment of rural conditions. There are two main projects under which fall the activities of this division:

The first project consists in having and running small stations, Insular, provincial or municipal, the last two established and maintained by the provinces and municipalities concerned with the coöperation of the Bureau of Agriculture in different localities where farmers may easily go and actually see how crops should be planted and taken care of. In these stations, local varieties of seeds and plants are also produced for distribution, and in a few cases improved breeding animals are kept for service.

The second project consists principally in securing plots of ground from individual farmers for coöperative demostration purposes. A farmer is asked to set aside a portion of his land, generally not less than one hectare in size, and to work and plant a part of it according to the instructions of a farm adviser or his assistant, and another part according to customary methods. The object is to let the farmer make comparisons and see for himself which system is better or more profitable. Aside from these projects, the employees of the Demonstration and Extension Division in the field teach the farmers also how to select seed rice, seed corn, etc., during harvest time, encourage people to raise improved fowls and livestock by the use of Bureau breeding stock, encourage people to have home gardens and orchards, to gather data for the Statistics Division of the Bureau, to purchase and in some cases inspect seed purchased by the Plant Industry Division, to loan rice or corn seeds and to collect payment of same, to coöperate and in most cases direct campaigns for the examination of plant pests and diseases.

Another work falling partly under the jurisdiction of the Demonstration and Extension Division is the carrying out of parts

of Act No. 2613 pertaining to the cultivation of tobacco. The division, through its tobacco inspectors, instructs tobacco planters in the proper methods of cultivation, advices the people of the necessity of building curing sheds and takes charge of the selection, collection and distribution of suitable tobacco seeds.

FOOD PRODUCTION CAMPAIGN

One of the main lines of work undertaken by the fieldmen was for the increased production of food supplies. In this undertaking the provincial and municipal officials, school teachers and members of the women's club and civic clubs have all coöperated with the fieldmen with the result of increased production of food crops such as rice, corn, etc. Increased planting of bananas and other fruit trees and vegetables, and increased interest in the raising of improved chickens and swine were noticeable. There were 119,439 fruit trees inspected, 19,035 of which were pruned and 19,726 were treated for diseases.

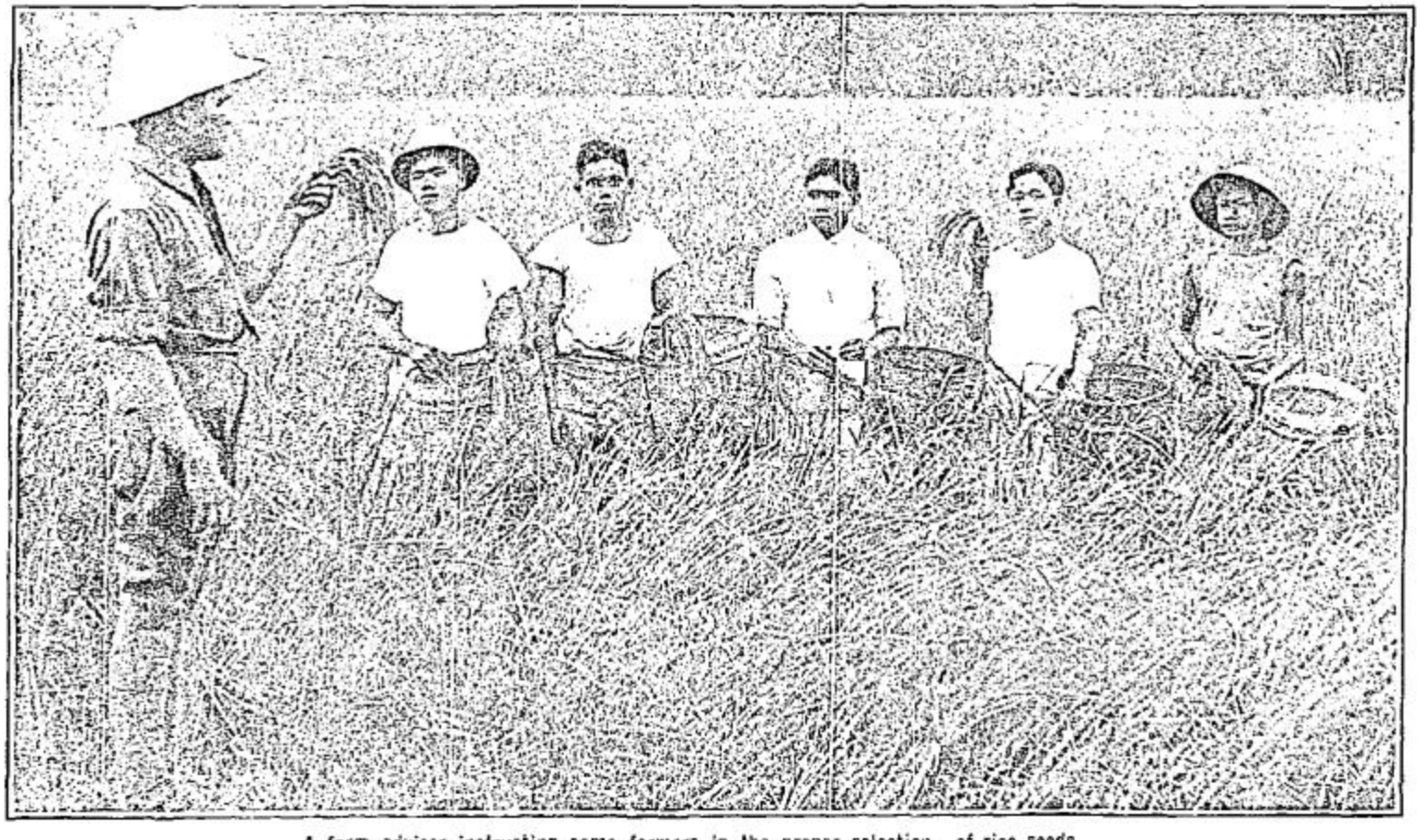
As one of the means of increasing production of crops the fieldmen have also induced farmers to build small communal irrigation systems wherever possible and as a result 232 systems were established capable of irrigating approximately twenty thousand hectares. The fieldmen have also induced 1,360 farmers to take up homesteads.

Twenty provincial and 248 municipal agricultural inspectors whose compensations were paid by the governments concerned were employed. The services of these men were, bearing in mind the limited qualifications possessed by each, satisfactory as a whole although better results might have been obtained if the appointees had been men recommended, and their work supervised directly by the farm advisers.

In connection with the food production campaign and demonstration and extension work there were held during the year 4,630 conferences on agricultural topics with a total attendance of 531,799.

AGRICULTURAL DEMONSTRATION STATIONS

Compared with last year the number of provincial demonstration stations or nurseries this year has slightly decreased. There were in the previous year 23, while there are only 20 this year, including the 3 Insular stations, conducted in the provinces of Abra, Albay, Antique, Bataan, Batangas (Insular), Capiz, Cebu, Ilocos Sur, Iloilo (Insular), Laguna, (Insular), La Union, Leyte, Mindoro, Nueva Ecija, Oriental Negros, Pampanga, Pangasinan, Samar, Surigao, and Tayabas. This decrease was due to the fact that some provinces previously having



A farm adviser instructing some farmers in the proper selection of rice seeds

Fruit-tree seed	3,116
Corn (cavans)	144
Peanut (cavans)	5
Cowpeas (cavans)	3.50
Mongo (cavans)	1.10
Sitao (cavans)	1.09

Aside from the above-named plant materials distributed there were also produced at the different stations 198,487 fruit tree seedlings, 19,328 vegetable seedlings, 86 cavans of seed corn, sweet potato cuttings 27,847 ready for distribution.

AGRICULTURAL DEMONSTRATION PLOTS

During the year there were 3,432 coöperative demonstration plots, 2,358 of which were planted to rice, 756 corn, 88 vegetable, 84 root crops, 55 tobacco, 39 sugar-cane, 16 coffee, 16 peanut, 7 mongo, 4 cacao, 2 sitao, 2 watermelon, 2 coconut, 2 fruit, 2 pine-apple, 2 sudan grass, and 1 cucumber. The plots covered an area of 3,101 hectares. The results obtained from the demonstration plots as compared with adjoining plots not supervised by the fieldmen were encouraging; the rice plots for instance, gave an average of 38 cavans while the adjoining plots an average of 32 cavans per hectare. The difference in yield was more noticeable in plots where the seeds were selected.

Twenty-two thousand eight hundred and twenty-nine farmers were instructed and helped in the selection of rice seeds for future planting and the amount of seed selected was 7,057 cavans. Small as the above figures may appear yet they show the increasing interest of the farmers year after year in this line of work.

TOBACCO PROPAGANDA

The campaign for the improvement of tobacco production was pushed during the year. Selected seeds were distributed, curing sheds increased although slowly and the number of tobacco inspectors also increased from 28 to 31. A great quantity of tobacco was produced partly due to the efforts of the inspectors, but mostly to the alluring prices which prevailed during the previous year. The low prices now paid for this product throughout the tobacco growing regions, however, will materially discourage the tobacco planters in raising much tobacco for the ensuing year.

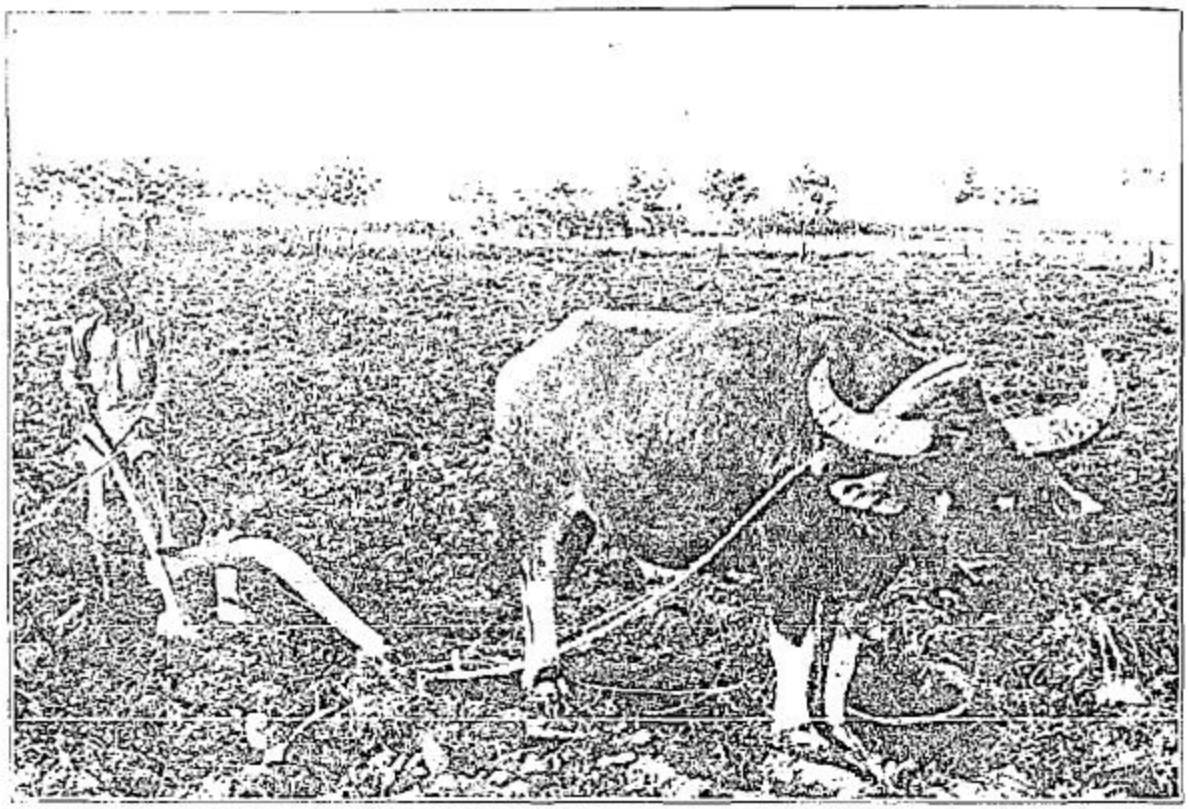
RURAL CREDIT DIVISION

PROGRESS OF THE WORK

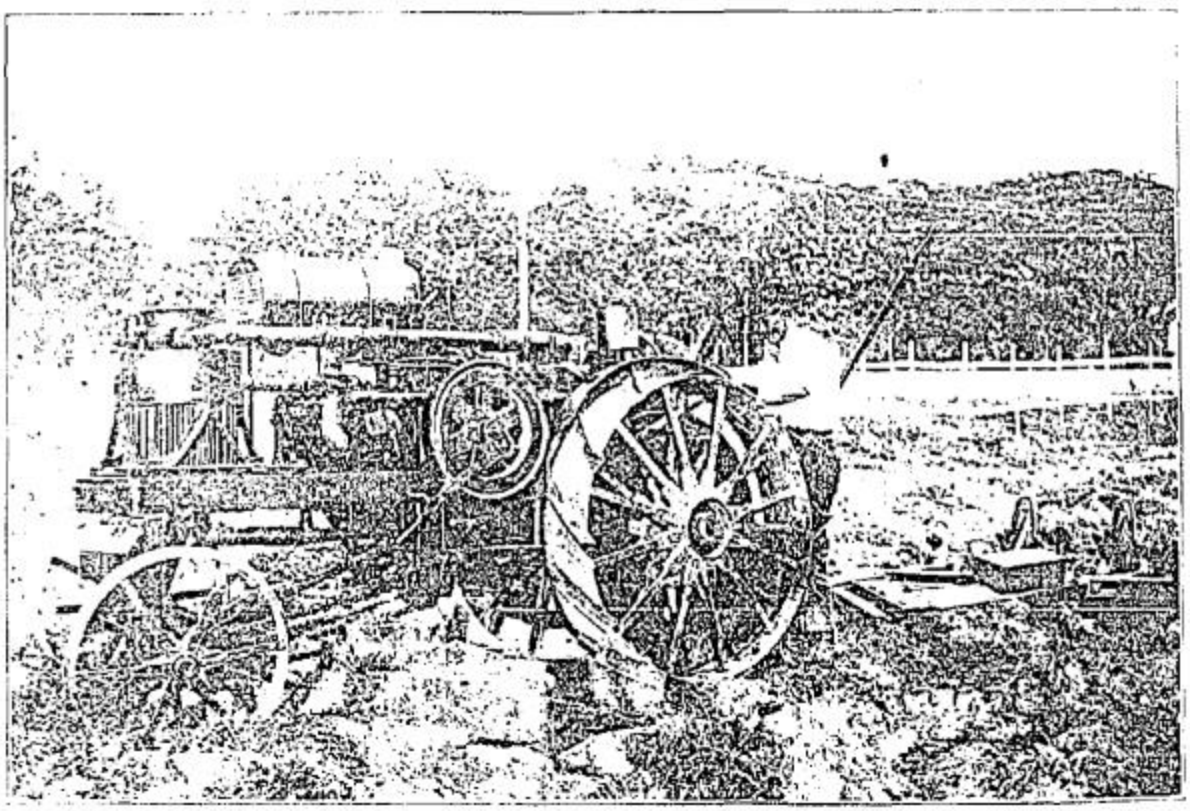
On January 1, 1920, there were 418 incorporated associations. On January 1, 1921, there were 527. This increase is due largely to the benefits of established associations coming to the at-

(*a*) One of the cooperators' fields planted to Echague tobacco—the seeds furnished by the Bureau of Agriculture. The owner of this field is cooperator Antonio Quintanar

(*b*) Isabela tobacco grown at Sagay Demonstration Station, Cebu



(a) The old method of preparing the ground for planting



(b) The new method of preparing the ground for planting

tention of persons in towns where no association existed and their taking steps to create enough interest to also organize. The Rural Credit Agents spent most of the year building up existing associations. The responsibility assumed by associations in borrowing capital and increasing their deposits and share capital made it necessary for the agents to prevent any failure, by urging the associations to carefully loan out these funds and to observe safe banking rules. We have 20 associations that each have over ₱20,000 loaned out, and another 50 associations that have ₱10,000 each loaned out; the others having varying sums, down to the few hundred pesos of new associations. This includes their share capital, borrowed capital, deposits, and interest earned. The agents have tactfully pointed out the safe course to associations and checked any tendencies to carelessness or imprudence. It is gratifying to be able to state that no serious irregularities have been committed. Only occasionally has it been necessary to be firm and correct or prevent such acts as loans to friends or relatives; fear to offend borrowers by insisting on prompt repayment of loans; directors quarreling over politics or personal differences; and similar ills that the whole human race is heir to. It is no small task to harmonize the different elements in a community who have never coöperated in anything. The fact that it is being done and that the older associations really understand the benefits of coöperation and discipline is very creditable to the members; officers, and the advising agents.

AN EXAMPLE OF PROGRESS

The association of Victoria, Tarlac, has a place among the twenty best associations. It has a membership of 580. Of these, 520 are small farmers owning less than 10 hectares each. It started three years ago with ₱250 and 40 members, and grew by inspiring confidence and rendering real help in that specially usury infested community. It now has over ₱6,000 paid in capital and ₱15,000 more in capital borrowed, deposits and interest earned—all loaned out in small sums. In addition to the rural credit association, the same members have a separate association to build their own rice mill and warehouse, with ₱12,000 paid in and another ₱15,000 in machinery and corrugated iron, secured by pledging their land. One special feature points out great hope for the future of all our associations. This Victoria association has averaged ₱500 a month during 1920 in the purchase of implements, plows, and barbed wire fencing. The large quantity of fencing is to prevent the trespass of work animals on neighbors' fields. The good feeling

and harmony alone has made this a good investment. The associations gets a liberal discount, which not only pays the freight and transportation—thus enabling the sale at cost price to members, but leaves enough profit to pay a young man to keep their accounts, sell shares, collect loans when due, seek deposits, keep the minutes of directors' meetings, visits the barrios to get new members, and anything else to advance the interest of the association. The directors voted his traveling expenses to Manila and living expenses while there, out of the implement earnings, to attend the annual conference of Rural Credit Agents as an honorary agent. It is no argument against rural credit that all associations are not doing the same. They will, when they find themselves, and develop the ambition to advance.

FINANCIAL STANDING

The following table is approximately correct. Loans are being repaid and new ones are made daily; new deposits are made and others are withdrawn; new shares are being sold constantly, so absolute accuracy is impossible.

Number of associations on December 31, 1920	528
Number of members	82,000
Number of borrowers	16,000
Number of depositors	1,500

Assets

Cash on hand December 31, 1920	₱390,000
Loans outstanding	1,939,000
Other items, implements unsold, etc.	19,000
Total	2,348,000

Liabilities

Capital Stock December 31, 1920	₱670,000
Cash and Liberty Bond Deposits	120,000
Other deposits	80,000
Rice and Corn Fund	1,289,000
Surplus	180,000
Reserve	9,000
Total	2,348,000

CONSTRUCTIVE WORK

The agents have carried out instructions to devote all their attention to existing associations, and to also help new towns to organize when possible. It is absolutely necessary that a man in need be furnished with the loan he must have from an association or he will be compelled to accure it from a usurer, but

it is just as necessary that he begin to save a part of his small income so that in time he will no longer be a helpless dependent, but be able to finance himself for his ordinary needs. Then our village bank will help him with a loan to buy those things new beyond his limited ability but necessary to better farming. Every agent understands that we are not in existence to be a convenience for the improvident to furnish cheap money to perpetuate chronic indebtedness. This desire to improve their economic condition has given life to the idea of coöperative rice warehouses, owned and managed by the rice growers, to enjoy the rise in price which the speculator now enjoys, because the poor man is now compelled to sell his produce cheap at harvest time when all his obligations become due and there is a glut in the market. A cash advance on the rice he deposits in his coöperative warehouse will enable him to meet his pressing obligations and still keep his rice to enjoy the profits of the rise in price when the surplus is eaten up. Our agents are also constantly taking up the idea of central banks in each province, to which the rural credit associations will affiliate and from which they will be able to borrow the working capital they need on the united security of all the members. These central banks will enlist the capital of the rich public-spirited citizens; they will be managed by the people of each province for the advancement of their own people; they will also attract deposits of money now hidden in houses and attract the surplus a farmer has after selling his crop. The idea of modern banking and its innumerable advantages will be taught by an object lesson in their midst. It is cheering to get the reports from the agents, of the hearty reception of this helpful plan and the promised help offered. The necessity and advantages of higher grade of coöperative banks is the natural consequence of the success of the 500 small rural credit banks which have created the desire and proven the possibility of successfully managing central banks.

RICE AND CORN FUND

One million pesos was voted by the Legislature (Act 2818) to be loaned only to Rural Credit Associations at 6%, to be reloaned to their members at 10%, for the exclusive purpose of being used for planting rice and corn. Some ₱900,000 were loaned out during the year ending April, 1920 to 225 associations.

This fund is under the direct management of the Secretary of Agriculture and Natural Resources. The interest has been promptly paid and the one-fifth of the capital borrowed, required to be repaid each year, has also been paid in each case, and this money has again been loaned out to new associations. The

account shows that a total of ₱1,289,000 has been loaned out to December 31, 1920. This is a practical demonstration of the feasibility of central banks, which would not limit loans only to growing rice and corn, but for all useful farming operations. It was necessary at times for the agents to have a heart to heart talk to a few careless associations on the importance of punctuality, to keep their credit unimpaired, etc. The sudden and complete transition from their former happy-go-lucky manner to strict banking was not expected by visionary dreamers.

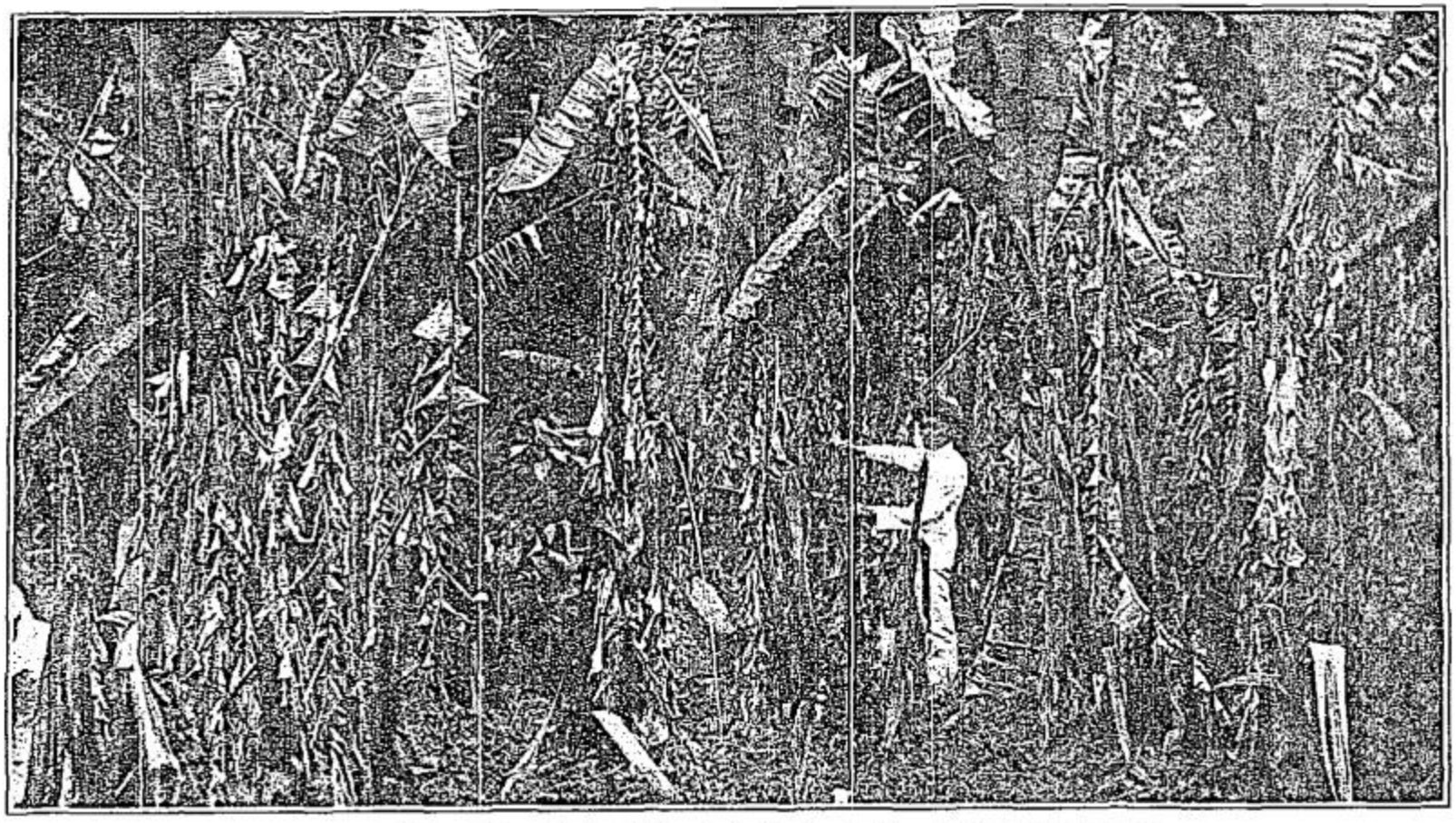
FINANCIAL PROBLEMS

Philippine farming can be divided into two main classes; the large hacendero and the small agriculturist. The former has access to money from the commercial houses that buy his produce for export or the established banks, while the latter is left largely to fate and the usurer, who takes chances accordingly. It is the purpose of rural credit to help these to help themselves by coöperation. It is perfectly clear that as these people have no surplus money to invest, therefore all that can be reasonably expected of them is that they will furnish some capital to show their good faith and unite their property, and on this combined security have access to money, the same as merchants and manufacturers enjoy. But as their security is not such as is acceptable to mercantile banking, nor can it be readily inspected, nor would this short term of ninety days make repayment possible, they are left without any ordinary banking facilities whatever. This being an agricultural country, and these small agriculturists being in the vast majority, it is absolutely necessary to provide a source from which they can secure the working capital they need. Individually these farmers are small but in the aggregate they represent the largest part of our agriculture.

CONCLUSION

Four years of rural credit work has put this plan beyond the experimental stage. Experience has corrected many errors in each association. They have learned some of the a. b. c. principles of self-help and banking and many are earnestly trying to learn more. Each town will develop the kind of an association it deserves and is fit to manage. There is no restraint on the active, and every encouragement is given to the dull and backward associations. They must work out their own salvation, aided by the sympathetic counsel of our agents who know how association succeed and can clearly explain the remedy for any defects they meet.

This is the field force that is incessantly carrying on the rural credit movement throughout the Archipelago



Abaca plantation, Silang, Cavite, badly attacked by heart rot, root rot and black weevil

While the two million pesos already loaned out is only a fraction of what is now borrowed by farmers, it is a solid beginning, wrought out by the people themselves. It is always difficult to introduce any new plan, disarm suspicion, and overcome apathy. Rural credit is no exception. The ground gained has all been held and a constant advance is made in every direction. We have much to cheer us in the fact that we can see the transition from helpless dependence on us for leadership to a beginning to depend on themselves. This "weaning" process is encouraged. We then assume the relationship of friendly advisers in difficult matters instead of, as in the past practically carrying all the responsibility and doing most of the thinking for them. Our agents have risen to the increased development. In a few cases agents requested permission to transfer to some other work less exacting, which was cheerfully complied with. There is pleasure in recording the loyal, disinterested work the agents have done to help their own people and to build up prosperity where it is most needed. Each agent is given a free hand in his district, which has also develop them. We face the new year with a better understanding of our problems and more experience in solving them.

PLANT PESTS CONTROL DIVISION

The projects which are being carried out by this division are as follows: Administration, Locust Extermination Campaign, Rat Extermination Campaign, Abaca Diseases, Coconut Bud-rot Campaign, Plant Inspection Quarantine Service, Entomological Specimens, and Miscellaneous Plant Pests and Diseases.

LOCUST EXTERMINATION

During the months of January and February, the infestation was confined to only 5 district of Cotabato, 6 of Bukidnon, 2 of Lanao and 1 of Davao; in March, 1 district of Davao, 5 of Cotabato, and 2 of Lanao were reported infested; in April, the infestation suddenly jumped from 8 to 35 municipal districts, including the provinces of Agusan and Surigao; and during the month of May, the number of infested districts went up to 46, including infestation in the Province of Bohol. The number of towns infested remained about the same until the latter part of July, when Leyte, was reported with 4 municipalities infested and during the month of September the town of Basey, Samar, was added to the list of infested municipalities. The heaviest infestation occurred during the month of October, when 52 municipalities were reported infested. The infestation since then gradually diminished and

at present writing only 26 municipalities are still infested, distributed as follows: Bohol, 9 municipalities infested; Bukidnon, 5; Cotabato, 2; Lanao, 4; Misamis, 3; Samar, 1; and Surigao, 2.

The Locust Law has been a great help in the extermination of the pest, as it makes the coöperation of the municipal and provincial officials and the town people obligatory. To see that the provisions of the law relative to the extermination of this pest are properly complied with, this Bureau has, from time to time, detailed inspectors to supervise the campaigns and at present vigorous campaigns are being conducted in the provinces of Bukidnon, Misamis, Cotabato, Lanao, Bohol, Leyte and Samar. The hearty coöperation of the Constabulary officials and soldiers has also been of value. This office also allotted funds to pay provincial laborers who assisted our inspectors in the supervision of the work, and to pay indigent locust fighters, especially in the provinces of Mindanao.

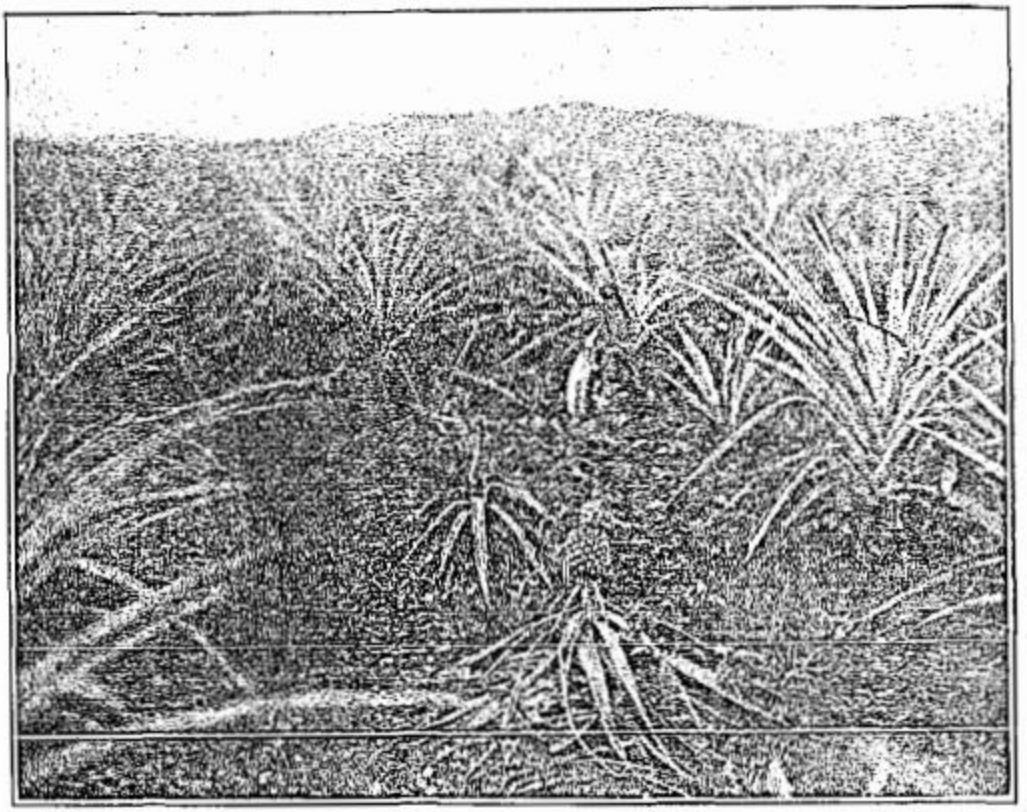
The problem of the total extermination of locusts in the Province of Cotabato where the locusts are supposed to have always existed, is the problem to be solved yet. The big area of cogonales and reeds, the majority of which have not been explored, are said by the people of that region to be the regular breeding places. This office has suggested that the Province of Cotabato and the Bureau of Forestry coöperate with the Bureau of Agriculture, in reforesting those places with such quick growing trees as the ipil-ipil (*Leucaena glauca.*) The province has agreed to furnish the necessary labor, ground or nursery; the Bureau of Forestry has agreed to supply the seed and supervise the work; and this Bureau has agreed to extend the necessary financial aid or by allotting sufficient funds from the Contribution and Gratuities fund to carry on this project.

RAT EXTERMINATION

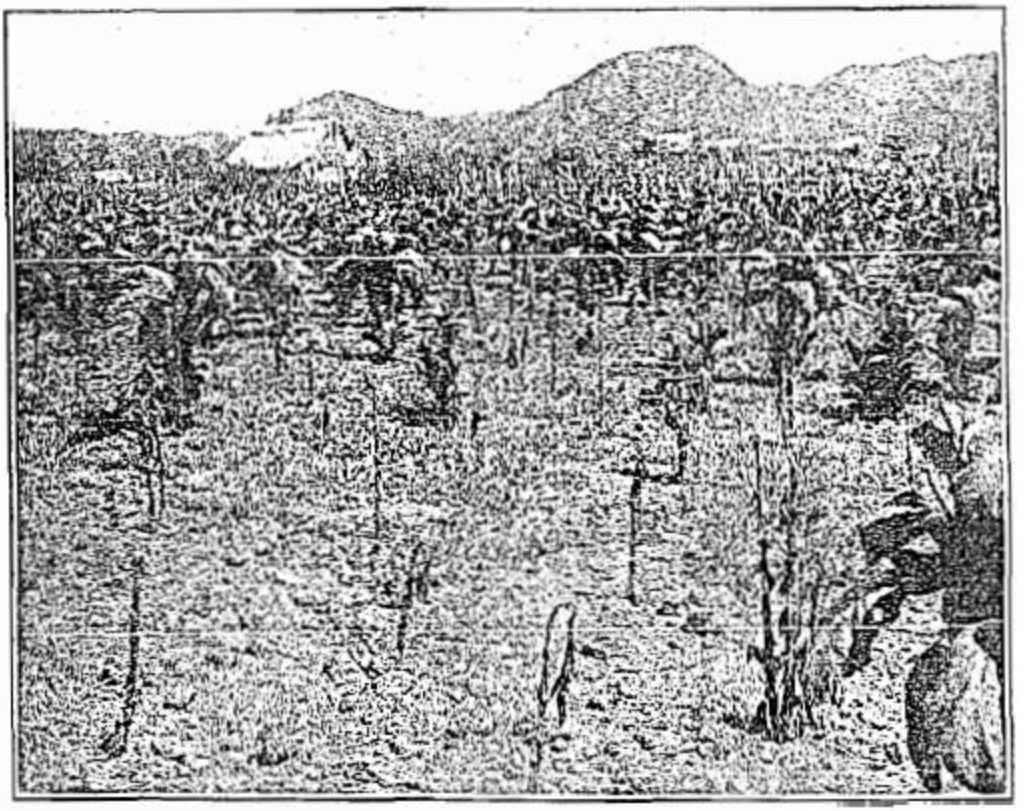
The rat campaign has been confined to the provinces of Camarines Sur, Camarines Norte, and Albay, as these provinces are badly infested. The results have been satisfactory, no more complaints being now received from those provinces where, previously, infestation was the heaviest. Mr. Victor Olan, the inspector in charge of the work, with laborers who have been assisting him, operated in the above-named provinces.

We have during the year distributed considerable white arsenic throughout the Islands, together with the necessary instructions for combating the rat pest, in response to the many requests which have been received.

Attack of "Paguipagui," *Thosea cinrara-marginata*, Banks, on Abaca



(a) Pineapple wilt



(b) A tobacco field attacked by the so-called Tanawan disease. This disease is found in Tanawan, Batangas and Bawang, La Union

Occasionally itinerant inspectors were sent to places to supervise the exterminating of rats, in the provinces of Cebu, Rizal, and Mindoro, where the work was carried on under the direct supervisions of our men. In some places, like Bohol and Leyte, campaigns have been carried on under the supervision of the farm advisers.

In Camarines Sur last year, we learned from reliable sources that many farmers were unable to harvest even a small portion of their rice because of the rats, but during this year a promising crop is expected. We may safely say that the rat campaign conducted in these provinces has contributed to this result.

Rat Bacillus Experiments.—About the latter part of 1919, 3 kinds of rat bacilli were brought from Japan which gave good results in the eradication of the rat pest there, with the idea of trying it on Philippine rats. Dr. L. Gomez, Chief Bacteriologist of the Bureau of Science, stated, after several trials had been made, that the bacillus was good only for mice and not for rats. Others authorities hold the same idea.

In view of the high cost of chemicals, some experiments have been made to utilize native poisonous plants for poisoning rats.

Dioscorea Triphylla.—Juice of sliced tuber was extracted with enough water to cover the slices. The extract was used with shredded coconut, boiled rice, etc. and used as white arsenic. This was found to be effective substitute for white arsenic.

Tangan-tangan (*Ricinus Communis*)

The pulp of the seed after extracting the oil is the part of the seed used. This also killed rats.

Calamiyasan (*Cuestis diffisa* Bl.)

The root of this plant was cut into small pieces and boiled in water (1 liter for every 100 grams). The boiling is continued until 1/3 of the water is left. The liquid obtained was used to wet the rat baits. Some rats were killed.

COCONUT PESTS AND DISEASES

As a result of the campaign against bud-rot, the worst enemy of the coconut, 13,571,143 trees were inspected in the Provinces of Laguna, Tayabas, Pangasinan, Batangas, Cavite and Zamboanga. Of these 8,734 trees were found to be infected and were cut down and burnt by our inspector, with the coöperation of the coconut grove owners, to prevent other trees from being infected. The number of trees infected with black and red beetles were 5,296 and 16,419, respectively. Most of these trees will survive, the attacks of the beetles not being fatal, except

in places where there are very few trees and generally in regions where sugar cane is grown, where the putrefaction of sugar bagasse generally becomes the source of the breeding places of the beetles.

There are miner coconut pests which have done slight damages to coconut trees. One of them is the coconut leaf miner, *Promecotheca cumingi* which has been reported from San Pablo, Laguna, Misamis and Zamboanga. The infestation at San Pablo was bad in that it spread over a big area of coconut trees. However, it disappeared as the eggs, larvæ and pupa were well parasitized. The outbreak in Zamboanga was controlled by parasitic insects also.

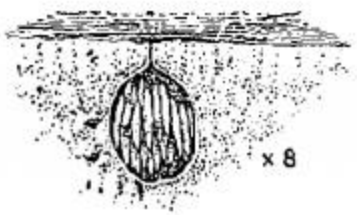
Another pest which seriously attacked certain coconut groves was the slug caterpillar, *Thosea cinereamarginata*. This broke out of the Provinces of Laguna, Zamboanga and especially Cotabato, where about 10,000, were infected at the same time. The infestation, however, was easily controlled by three species of hymenopterous insects which parasitized the larva of this slug caterpillar, and one dipterous which parasitized the pupa. In the barrio of Mercedes, Zamboanga, the infestation of this pest greatly alarmed the people and the slugs were found to be unparasitized for a time. This was due to the uncultivated land which separates Mercedes from Zamboanga by about 4 kilometers, where nothing but grasses grow. It was therefore necessary to breed the parasitic insects elsewhere and liberate them in the barrio of Mercedes.

PLANT INSPECTION SERVICE

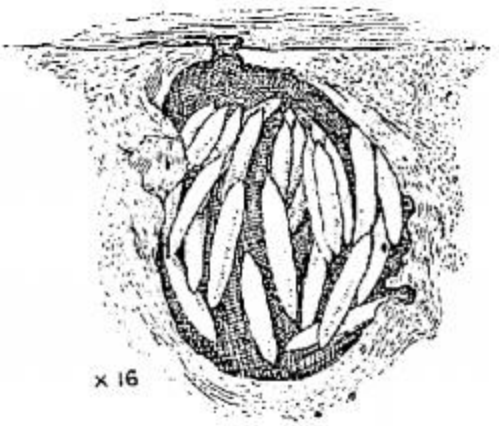
The plant inspection service for the year 1920 showed a marked increase in the inspection of plant materials. Many new insects have been intercepted in the shipment of plant materials. Notorious among those intercepted was the insect of the Bruchus species found on a big shipment of cowpea seeds imported by the Bureau of Education from C. C. Morse and Company of California. Eight hundred eighty pounds of this shipment were condemned as they were badly infested with weevils (*Bruchus* sp.).

Another pest intercepted from a shipment from a foreign country, was a coleopterous sugar cane borer (*Rhabdoenemes obscura*). This pest was intercepted from sugar cane cuttings imported from Hawaii.

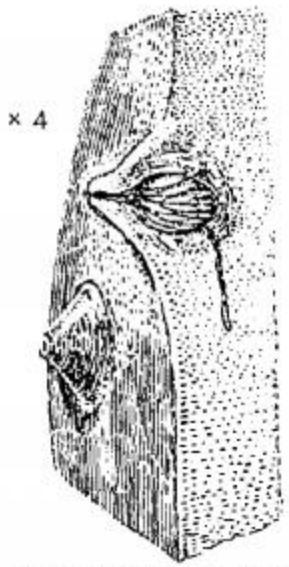
Fruit Inspection.—To prevent the entrance of the Mediterranean Fruit Fly, we have formulated Administrative Order No. 7, prohibiting the importation of fresh fruits from countries



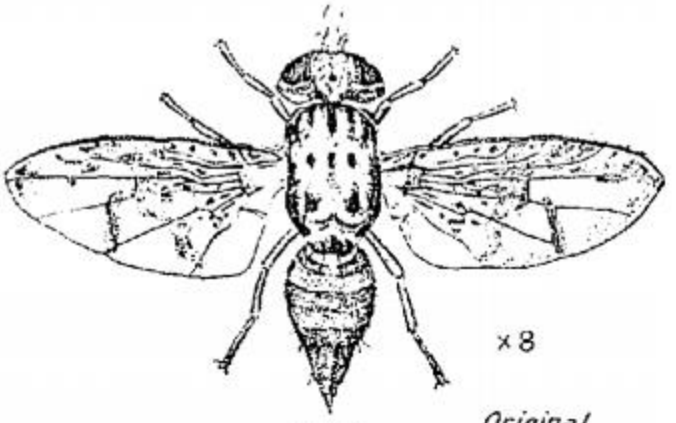
Cross section of peach, showing egg cavity of the Mediterranean fruit fly with eggs. Drawing made directly after oviposition.



Cross section of peach, showing the general shriveling of the walls of the egg cavity and the separation of the eggs. Drawing made 1½ days after oviposition.



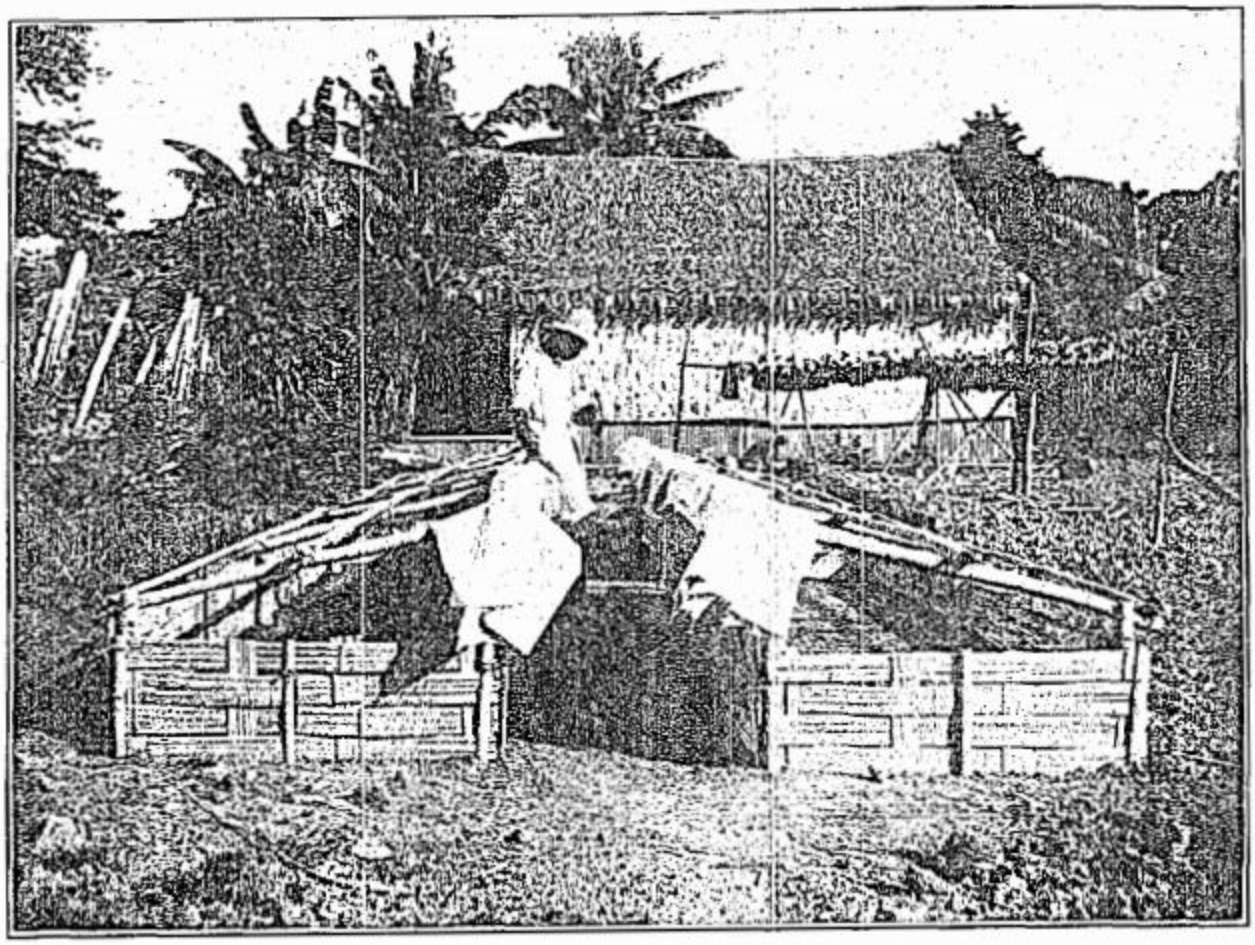
Section of grapefruit rind, showing two egg cavities, one in cross section. Drawing made one week after fruit was picked. Note conical elevation about the egg cavities left by the withering of the rind; also the thickened walls of the egg cavity and the single larval channel in the rag.



Adult

Original
(From dry sp.)

Mediterranean fruit fly
(Ceratitis capitata Wied.)
Fam. Trypetidae
(From U.S. Year Book-1917)



Tobacco seed-bed with sterilized soil

where the Mediterranean Fruit Fly has established itself. However, due to the protest entered by the British Consul General, a modification has been made allowing certain states of Australia to export fruits into the Philippines, subject to the following conditions:

Fruit may be only allowed from the uninfested states Victoria, Tasmania and South Australia and must be certified by the Plant Inspectors of these states. With each shipment a certificate must be furnished from a properly authorized official of the Australian Government guaranteeing that such shipments originally emanated from the non-infested states and that they are free from these and from any pests or diseases.

If the Australian Government is prepared to certify that the States of Tasmania, Victoria and South Australia are entirely free from fruit fly, it is only fair to accept fruits from those states subject to our inspection for other injurious insects and diseases. Should this procedure be not complied with or any further observations by our inspectors show the fly, we shall have to quarantine those states also or the whole of Australia, as the case may necessitate.

PLANT PATHOLOGY SECTION

In April of 1920 our Plant Pathology Section was inaugurated and the Bureau having no laboratory at present, the men were appointed to work in the pathological laboratories of the Bureau of Science, temporarily, under the supervision of the Chief of the Plant Pest Control Division and of the Mycologist and Plant Pathologist of the Bureau of Science. Mr. Mariano Medalla was appointed assistant plant pathologist and three other graduates were appointed from the College of Agriculture at Los Baños, with the designation of Assistant Plant Inspectors. One of them, Mr. Gaudencio M. Reyes, is specializing on rice diseases; Mr. Feliciano M. Clara is specializing on the diseases of tobacco and pineapple, while Mr. Felicísimo B. Serrano is specializing on the diseases of abaca, bananas, etc.

FARM STATISTICS DIVISION

PERSONNEL

During the year, 34 employees left the service and 44 accepted positions. Of the former, 19 were permanent. Of these, 6 went to other bureaus and 13 sought other jobs. Of the latter, 5 were permanent coming from other bureaus and 21 were selected from the original list of the Civil Service. During the year 16 employees were given promotions. At the end of the year the Division of Farm Statistics was composed of 47 employees.

ROUTINE WORK

This was as before, confined to the transcription and the compilation of the data contained in the monthly, quarterly and semi-annually reports from different sources received by the Division, in the drawing of maps and graphics and the making of statistics. Also the Division has had charge of the compilation of data regarding seed selection, distribution of seeds and plant materials, loan of seeds, analysis of sugar, etc.

The routine work, however, of the Division, has been many times increased this year due to the addition of 31 more crops to the usual 9 heretofore carried in the records.

During the year, too, the radical changes introduced in the regular blank forms of the monthly and quarterly reports have increased considerably the work of compilation and supervision of this Division, to the extent that the actual work performed is much greater than before.

Agricultural statistics are subject to numerous defects and errors. They affect personal property and interests of the community, and there is, therefore, a natural tendency to disguise the facts according to the physical or moral capacity of the informants. Increased taxes tend to diminish amounts; personal prestige, to swell bulk, while ignorance, speculation and malice either increase or decrease figures. To this universal rule, the absence of records, very common in the Philippines, is another item that must be contended with.

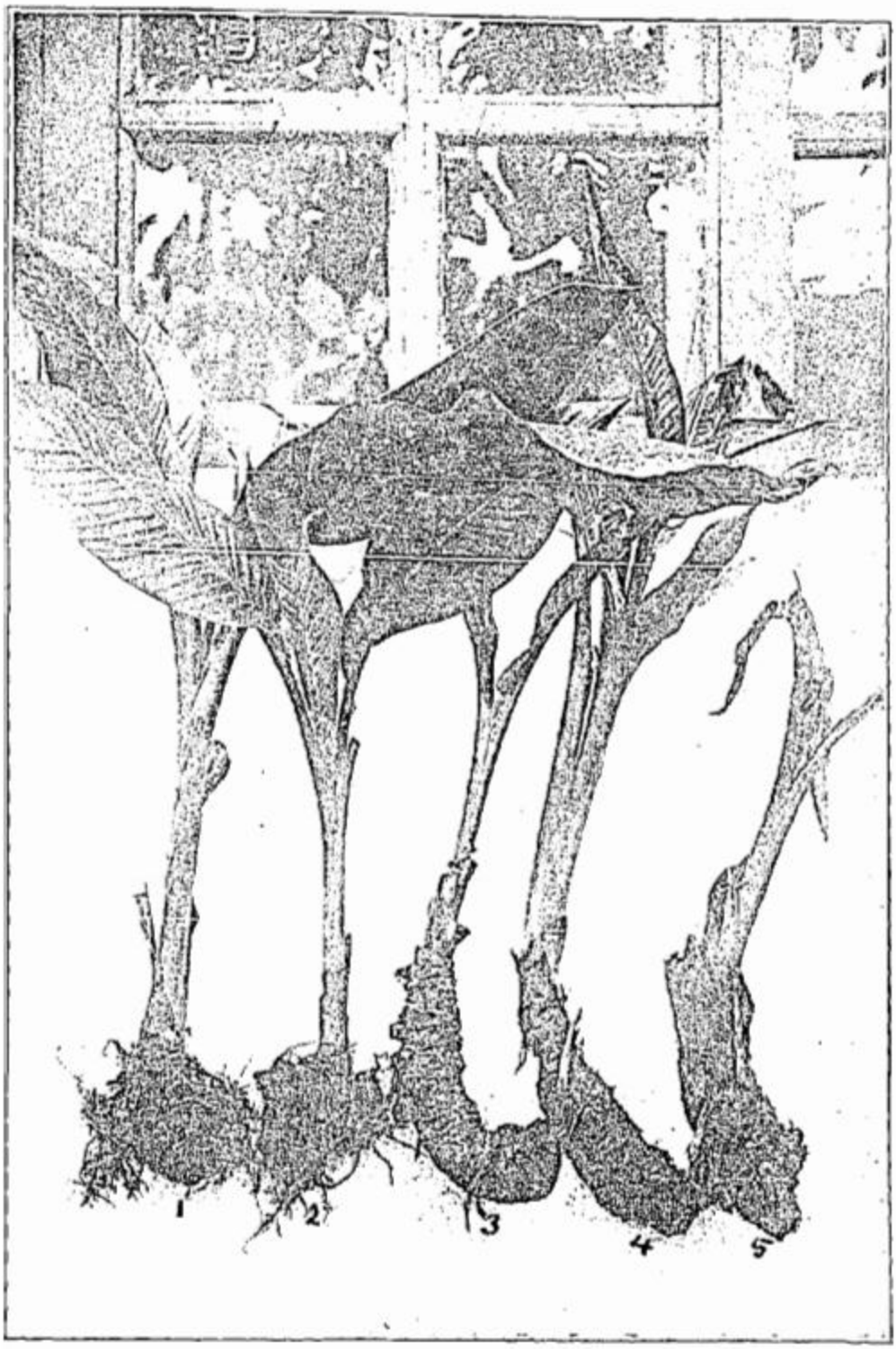
The coöperation of the farm advisers in the gathering of data on crops and livestock for this Division was requested. The contribution of these field employees was of material value in securing accuracy for the statistics of this Division.

The records of this year have been far more valuable with the assistance of these employees, than those for preceding years, and great hopes are entertained that these records will, in the course of time become more and more dependable and interesting.

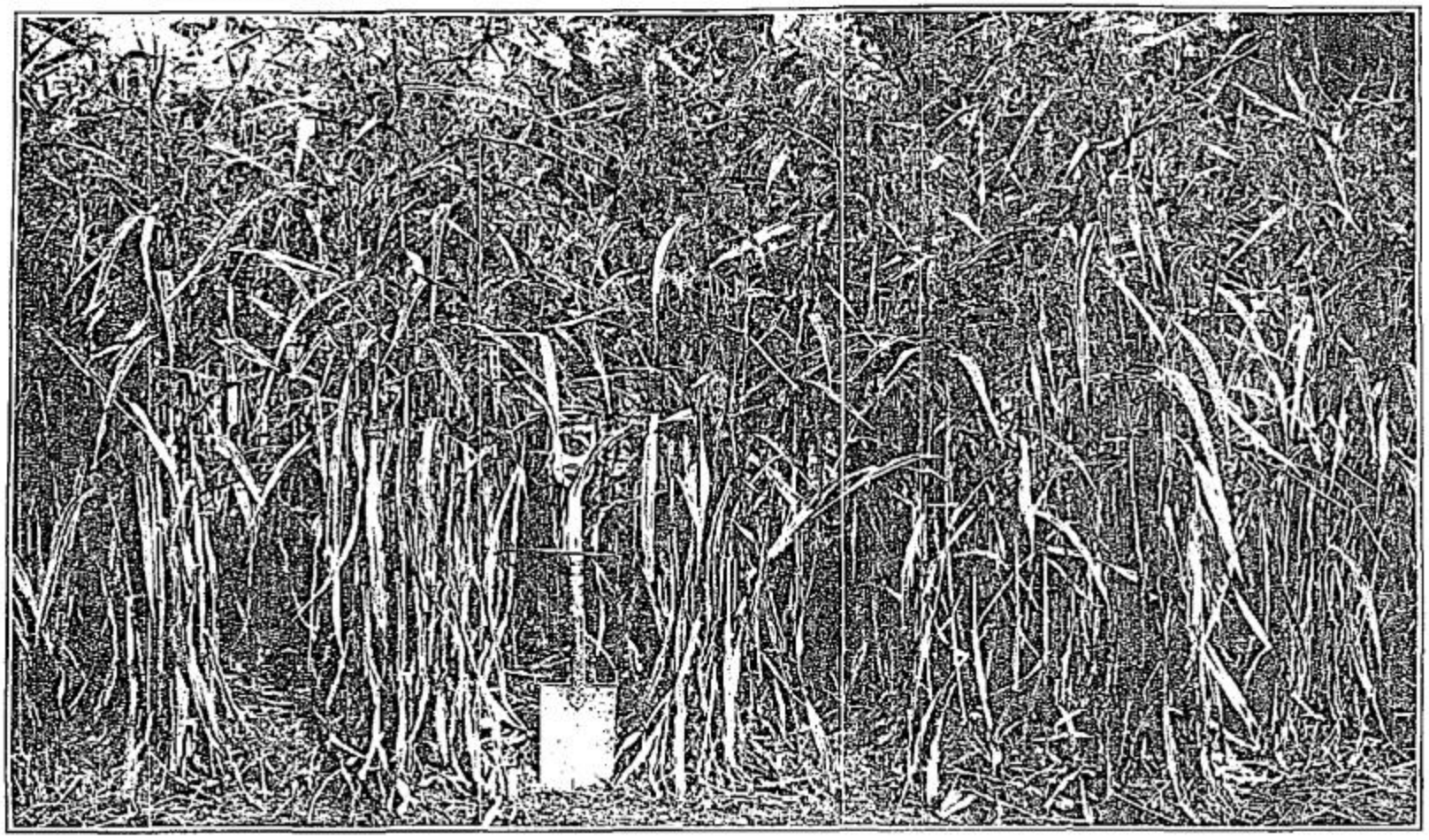
PLANT INDUSTRY DIVISION

PERSONNEL

There are 40 employees in the Plant Industry Division including 3 clerks, 16 of whom are permanent and the rest temporary. Two of the employees are at present abroad, one specializing in sugar technology and the other in tobacco culture. Of the personnel, 10 are new appointees, including a clerk. Four have been taken from other divisions, while 5 have been transferred, including the agricultural adviser and the Chief of the Division, the latter having been appointed Assistant Director of Agricul-



Root rot disease of abaca. 1 and 2 are infected suckers planted on soil at Singalong Propagation Station. 3, 4, and 5 are infected suckers planted on soil from an infected field



A Stand of Adlay plants, *coix lachryma jobi* L., Lamao Experiment Station

ture. Four of the employees have resigned. The increase in personnel was due to the extension of the scope of our field work.

EXPERIMENT STATION PROJECTS

There are altogether 12 experimental and propagation stations under the supervision of the Plant Industry Division, 5 of which were established during the year. Various experiments and researches are being carried on at these stations.

Singalong.—Seed distribution, and plant propagation and distribution.

Alabang.—Variety tests and seed selection of rice; rice pedigree work; fertilizer tests; irrigation tests; hybridization; propagation of sugar cane; quarantine work on sugar cane and miscellaneous tests.

Batangas.—Citrus orchard management; citrus propagation and variety tests.

Pangasinan.—Rice breeding, variety, and irrigation tests; propagation of seed for distribution.

La Carlota.—Sugar cane tests; fertilizer tests with Negros purple cane; sugar cane analysis; acclimatization tests with sugar cane; cane planting tests; variety tests on upland rice and corn; propagation of sugar cane, corn, rice, and vegetable seeds for distribution.

Lamao.—Citrus fruits; pineapples; avocados; papayas; annonaceous fruits; coffee variety tests; propagation of vegetable seeds; variety tests of upland rice; propagation of seedling sugar cane, and quarantine work in sugar cane.

Damao.—Tobacco acclimatization; tobacco breeding; variety tests; seed propagation; harvesting and curing tobacco and minor experiments.

Sagay.—Variety tests of corn; seed selection; propagation of seed corn.

La Trinidad, Benguet.—Semi-temperate fruit station; acclimatization of apple, peach and pear trees, and small fruits and potatoes.

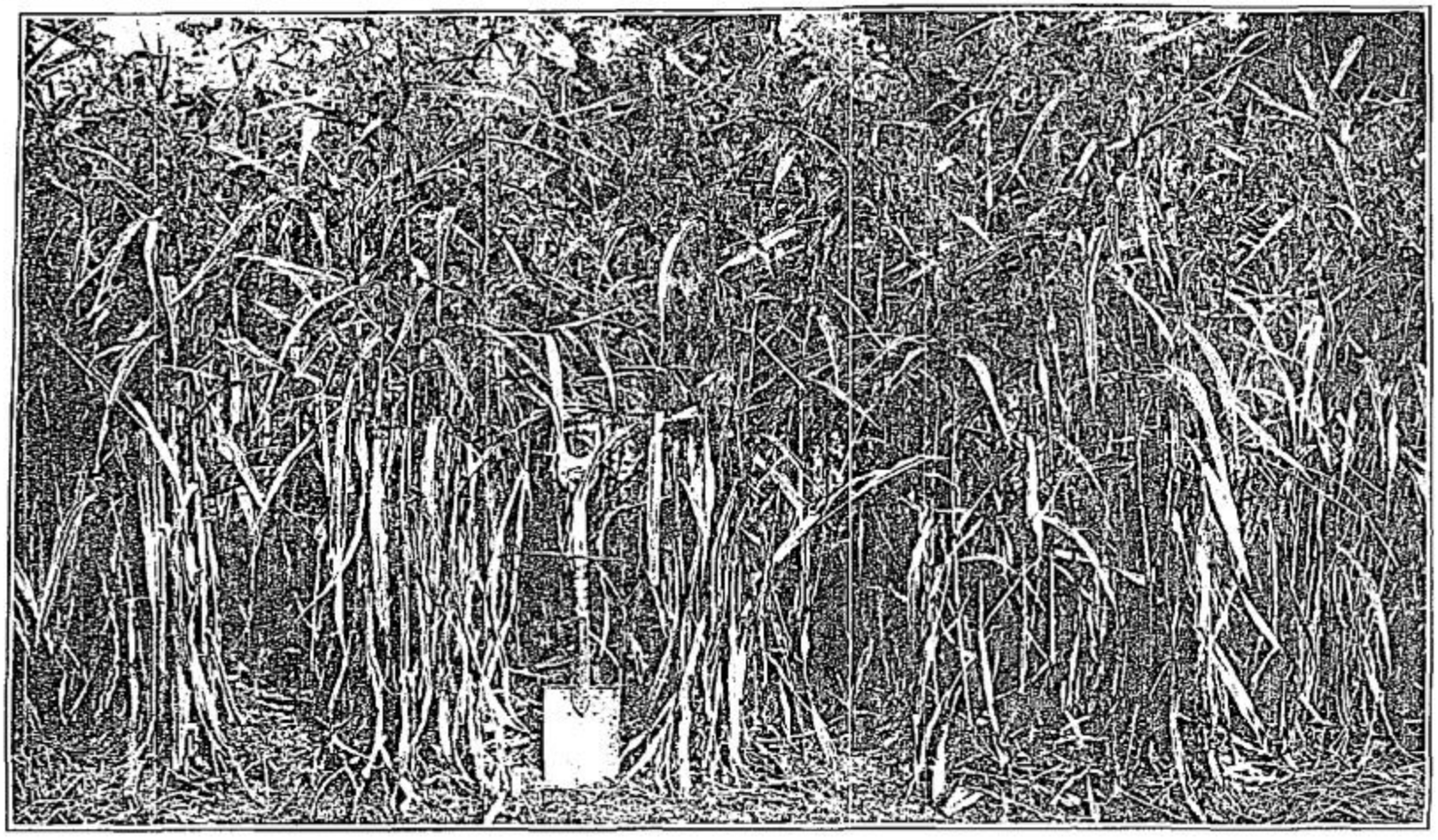
San Pablo, Laguna.—Propagation of lanzon plants for distribution.

Isabela.—Variety tests, seed selection and propagation of seed corn.

Cotabato.—Tobacco culture; propagation of tobacco seed and harvesting and curing tobacco.

FOOD CAMPAIGN

To encourage the production of corn, a circular to Farm Advisers was issued on May 18, 1920, relative to the corn campaign. To carry this to a successful issue the Plant Industry Division



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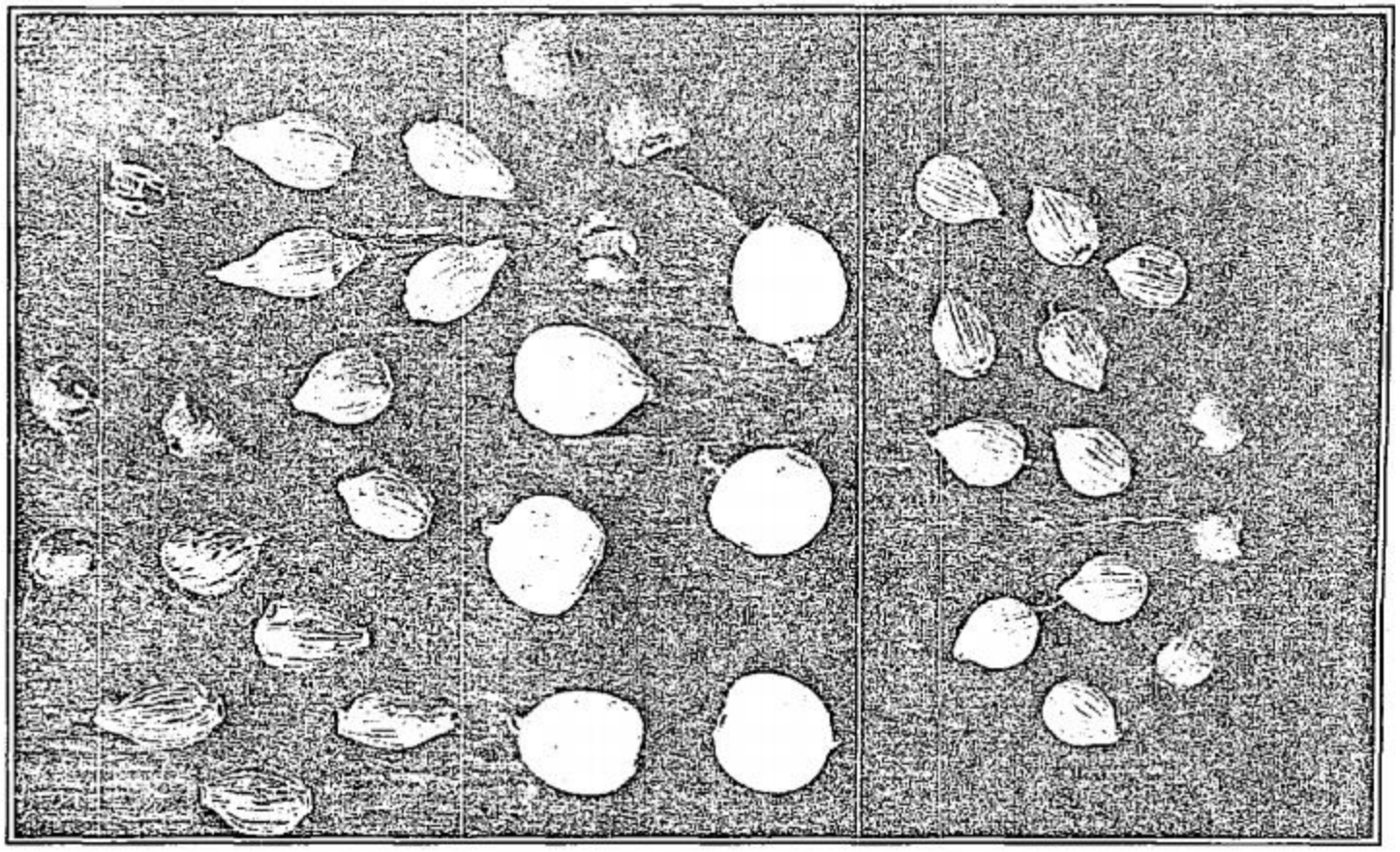
supplied all the seed corn needed by the farmers. After the floods of July, which did great damage to the rice seed beds in the provinces of Bulacan, Pangasinan, Tarlac, Pampanga, and Nueva Ecija, a call came for the necessary seed palay for replanting the seed beds. There was no difficulty in meeting this demand as plenty of seed was stored for such emergency cases. Efforts were made to increase all food crops, such as cereals, root crops, fruits and vegetables. Seeds were either furnished free or in the form of a loan.

Correspondence.—About 200 communications are received daily for action by this Division, and of these fully 30% required direct reply. The communications are mostly requests for seed and plant materials and cultural directions.

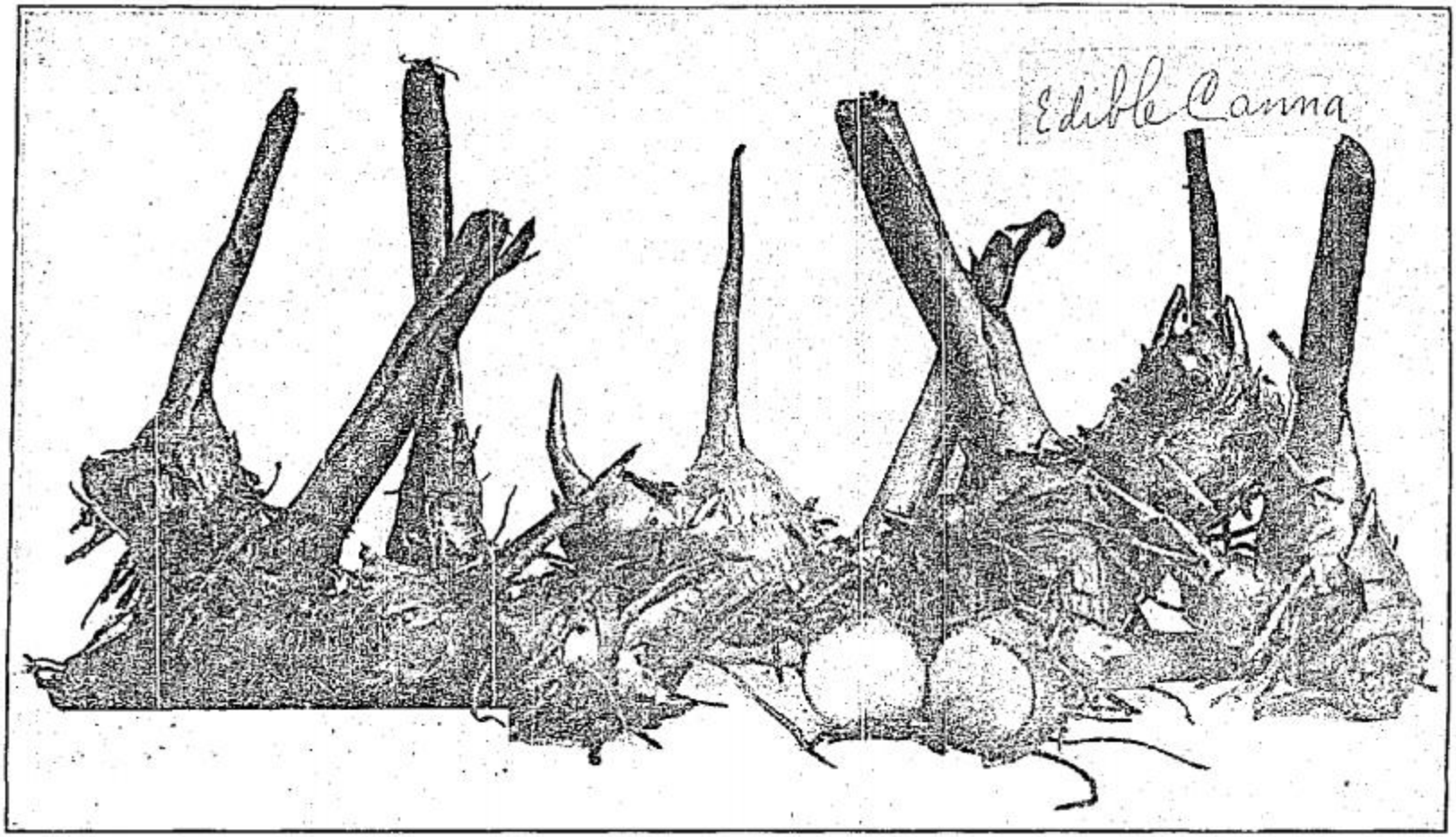
SEED AND PLANT DISTRIBUTION

Seed and plant distribution and introduction are the most important features of the activities of the Division. Foreign seeds and plants are first acclimatized in the Islands before being distributed and recommended. In 1920 there were introduced from abroad 21,765 kilos of vegetable and other seeds and 64,070 plants of various species, mainly fruit trees. The distribution of seed and plant materials during the year may be summarized as follows:

Material		Quantity	Value
Irish potatoes	crates	56	₱352.56
Rice	cavans	11,236	81,461.00
Corn	do	1,038	9,342.00
Cowpeas	do	28	454.40
Mongo	do	58	607.25
Peanuts	kilos	387	119.97
Sugar cane cuttings	do	349,707	1,748.54
Economic plants	plants	73,397	14,679.40
Economic plants	cuttings	73,301	219.90
Economic plants	suckers	16,385	983.10
Economic plants	rootstock	200	2.00
Economic plants	kilos, seed	504,652	756.94
Economic plants	seeds	22,766	45.53
Economic plants	fruits	2,211	110.55
Economic plants	tubers	54	1.08
Ornamental plants	plants	1,630	244.50
Ornamental plants	cuttings	587	5.87
Ornamental plants	suckers	2,957	29.57
Ornamental plant	seeds	389	.78
Miscellaneous plants	plants	743	74.30
Miscellaneous plants	cuttings	24	.24
Miscellaneous plants	suckers	6	.06
Miscellaneous plants	kilos, seed	258.25	516.50
Vegetables	kilos, seed	7,307.375	36,536.88
Total			148,292.92

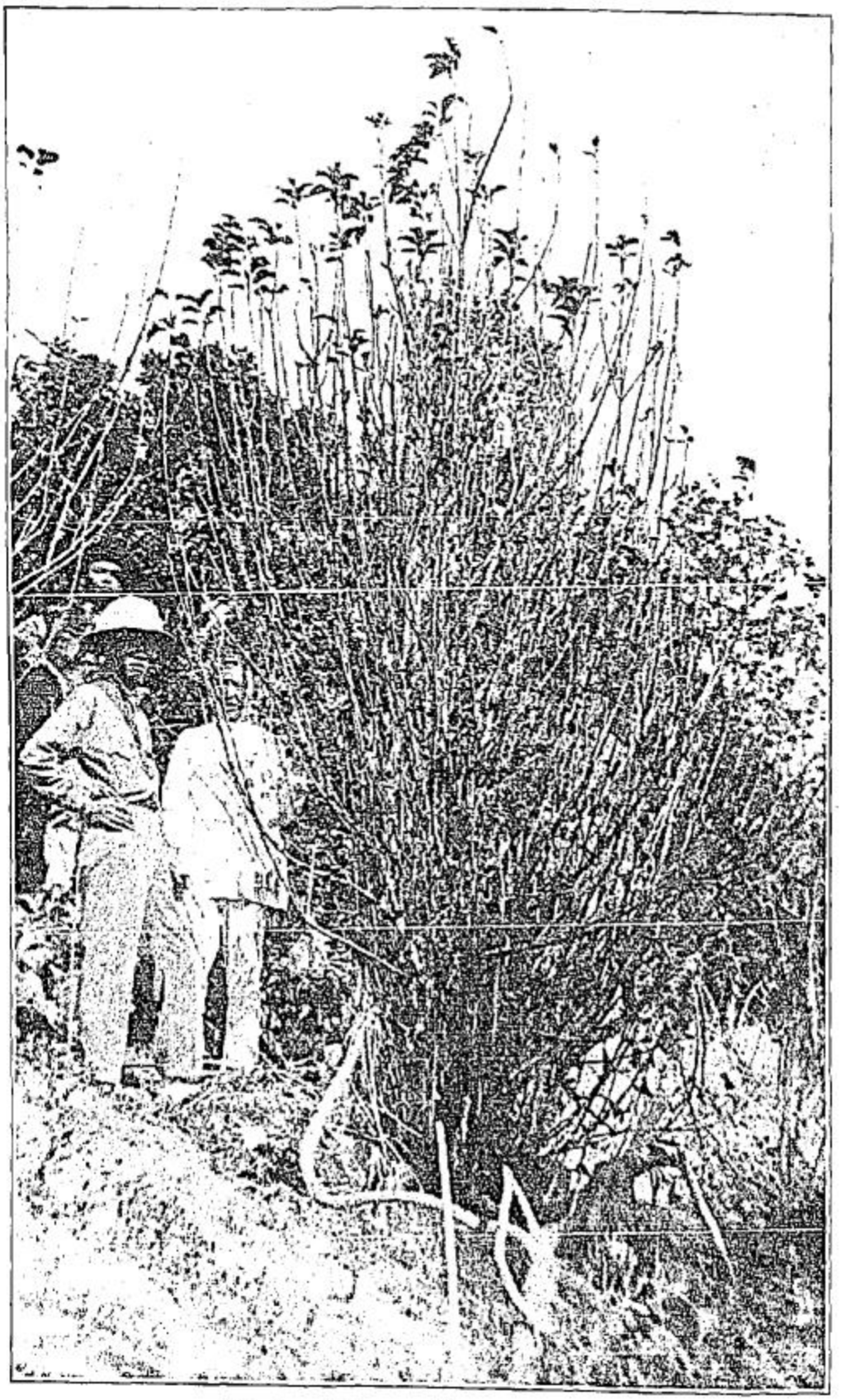


Different varieties of Adlay grains *Coix lachryma jobi* L., Lamao Experiment Station



Edible Canna, *Canna edulis*, Lamao Experiment Station

A portion of the vegetable garden at Singalong Experiment Station



Apple tree, eight years old. Mountain Province

AGRONOMY SECTION

Rice Project.—The main object of this experiment was the propagation of improved seed for distribution to the public and the study of the best method of culture of rice with the object in view of increasing permanently the production of this cereal.

Results from eleven years of experimentation of rice prove that the present production of rice per hectare of about 25 cavans can be easily raised to at least 40 cavans per hectare by using selected seeds adapted to local conditions. In the Alabang Central Rice Breeding Station a great number of varieties gave at least 40 cavans, in spite of the conditions there, which are not favorable to the production of rice. At this rate of production if all the farmers in the Islands would only plant seed of *selected varieties adapted to local conditions*, it is certain that even without increasing the present area planted to rice there would be produced enough rice to supply the demand.

Our soil is specially adapted to the cultivation of rice and is not inferior in any way to that in other rice countries yet our production per unit area is far below of that of other countries. This is partly because a great number of the varieties planted by our planters are not worth the planting, as they give yields which hardly pay the planting expenses. These varieties should be discarded for high yielding ones which gives almost double the yield at the same amount of expense. So that in this project it is the aim that a larger amount of improved seed be propagated for distribution to the public and the improvement of selected varieties for adaptation to different local conditions.

Varieties of rice, like other plants, even if produced from good stock do not give good results sometimes when planted in other provinces due to different local conditions. In order to insure the rice crop the section planned to establish one sub-station in each region, but due to lack of funds and personnel only one was established, the Pangasinan Rice Sub-station. The object of this station is to try out the varieties improved in the Alabang Station to see if they would adapt themselves to local conditions there and if not to improve whatever variety that may turn out to be the most promising, and also to study the best cultural method for the locality. It is hoped that at least half a dozen of these stations may be established during 1921, so that seed adapted to each particular locality will be produced and distributed to the farmers.

The Pangasinan Rice Sub-station is expected to give at least 800 cavans of seed for distribution in that province.

At Lamao Horticultural Station, about 2 hectares of land have been devoted to experimentation on upland rice. This area will be enlarged, when land in that station becomes available.

The investigation on rice was grouped into upland and lowland cultures. Experiments on lowland palay were carried on in both Alabang and Pangasinan stations while the upland varieties were conducted at La Carlota and Lamao stations.

The following points are abstracted from the records of the experiments on rice conducted this year in all the stations:

TESTS OF LOWLAND VARIETIES

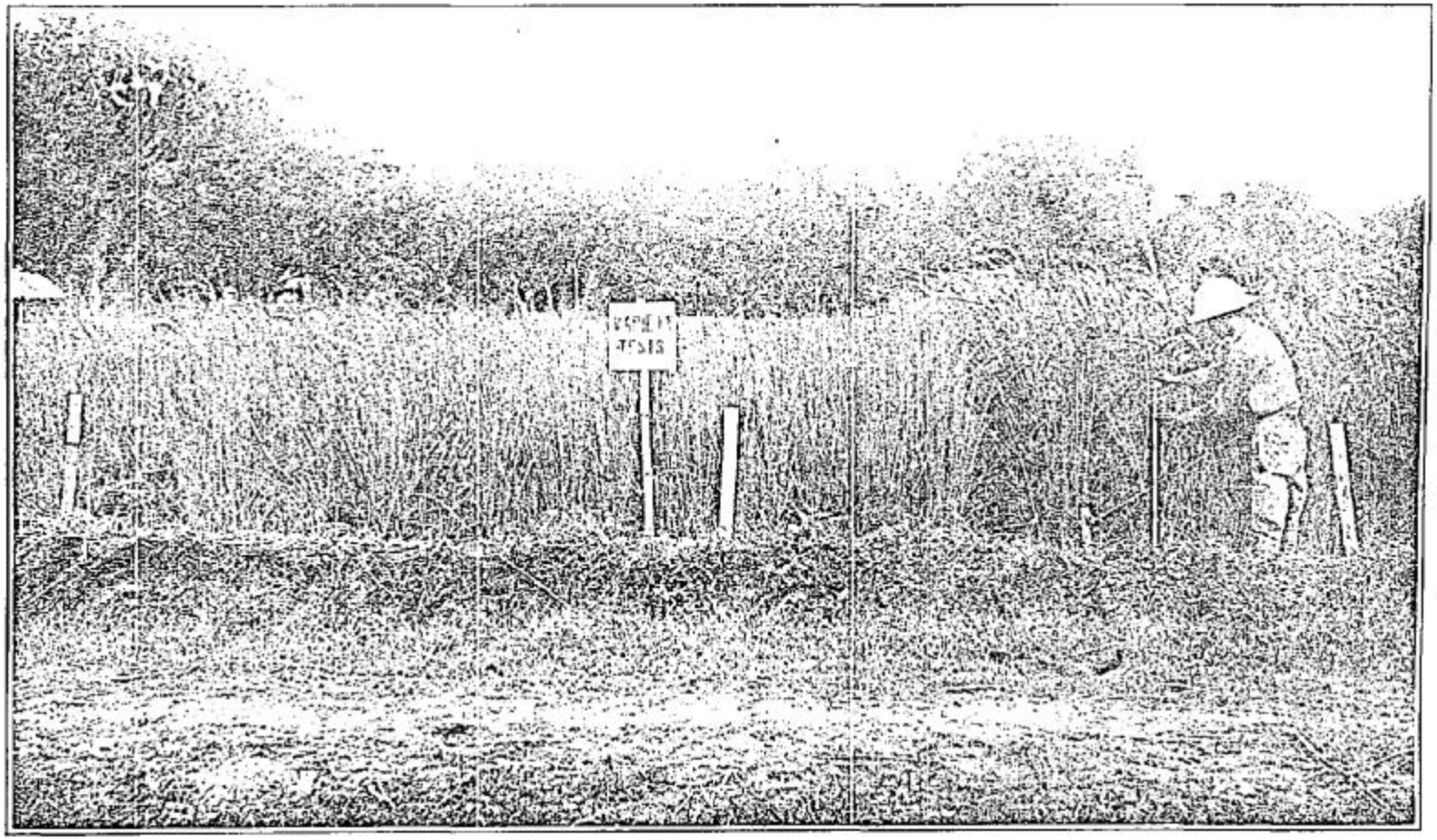
Object.—To select the most promising varieties for improvement.

There were tested at Alabang Central Rice Station 364 named varieties of rice of different origin. Of these 308 are native, collected from the different provinces, 2 from China, 1 from Formosa, 10 from Borneo, 10 from Java, 7 from Japan, 5 from Siam, 9 from Saigon, and 12 from the United States and consisting of bearded, non-bearded, glutinous and non-glutinous. The seed was sown on June 15 and the seedling transplanted to the permanent plats when the seedlings were at the edge of 30 days or more, according to length of maturity. The test plats were increased in area this year from 16 to 50 square meters making exactly $\frac{1}{200}$ of a hectare, to get more reliable data.

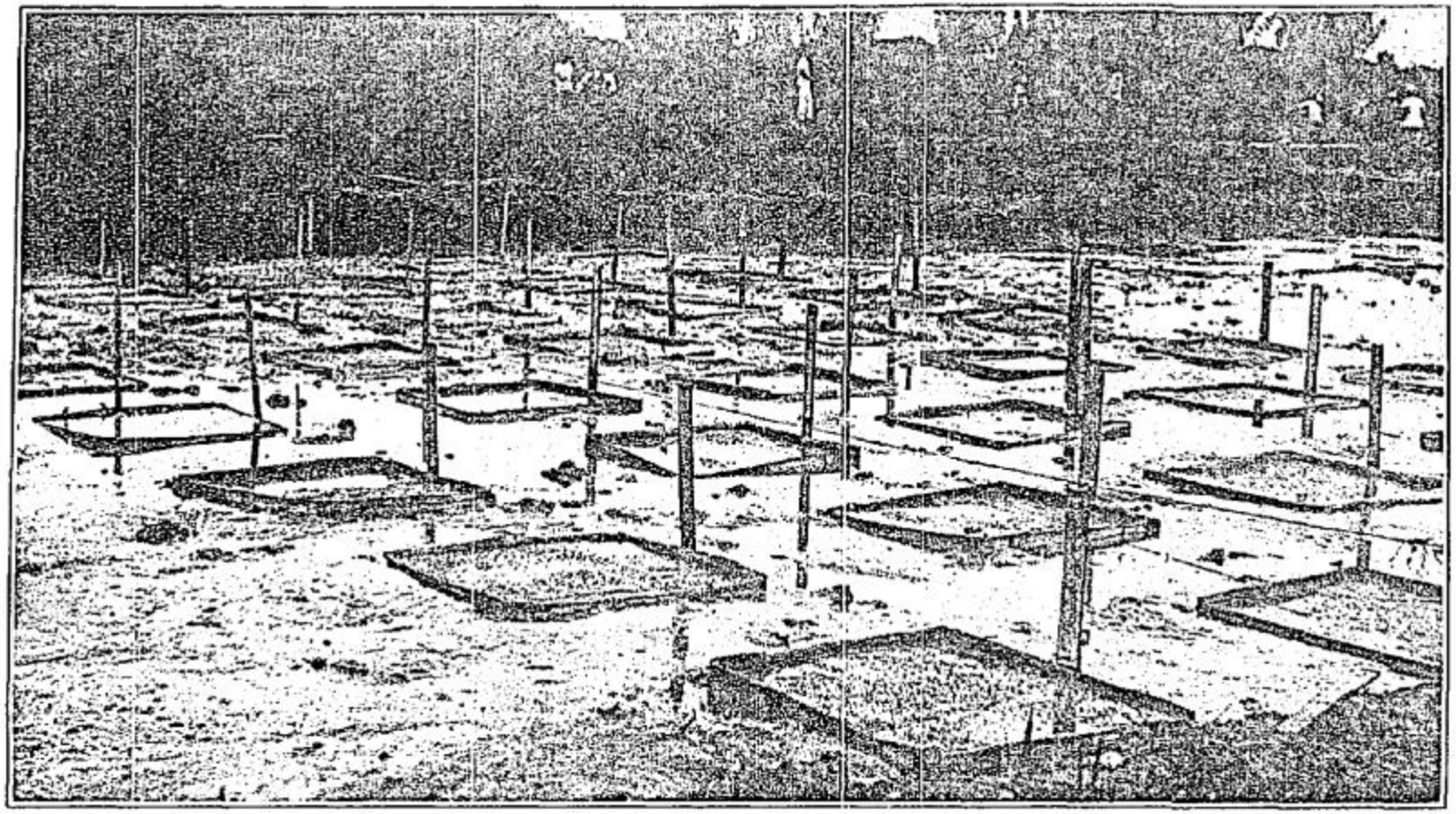
Data describing each variety was taken together with the habit, age at heading, maturity and the yield per plat and the best varieties ware determined. These data were recorded in the B. A. Form No. 142 for the records of the office. A test was also made to determine the flavor and cooking qualities of each of these varieties.

The varieties received from Japan and the United States did not do well, as they were not acclimatized in this country. They were dwarf and headed out too early, giving very poor crops. The varieties Honduras and Ventula, received from the States, however, have shown better results than the Japanese varieties. A trial planting of these varieties during the dry season will be made to find out if they would give better results if thus planted as they may not be accustomed to growing during the wet season, as are our native varieties.

Most of the varieties in this test have not shown a very wide range of yields so that the elimination of the low-yielding ones can not be made until the varieties have been tried for several years, except a few which will be eliminated to reduce the number of next year test.



Rice variety test plots—Pangasinan Rice Breeding Sub-station, Rosales Pangasinan



Seed-bed—Rice variety test—showing the method of keeping separate the different samples of rice. Alabang Central Rice Breeding Station

Of the 314 varieties in this test nine varieties have been found to be duplicated. Although they came from different provinces and bear different names have the same characteristics in all respects; hence they were classified as duplicate varieties.

At the Pangasinan Rice Sub-station a test of 60 of the best lowland varieties found in that province together with pedigreed seed from Alabang of the varieties Cruz, Roxas, Calibo, Piniling Daniel, Macan Potot, Conner and Minalabon and Mangasa was made, to find out which variety will be best for Pangasinan conditions. Seed of these varieties was planted last June, but unfortunately before the seedlings were transplanted from the seed-bed there was a terrible flood from the Agno River, the worst ever recorded in Rosales, about the middle of July that destroyed them. The water came over a meter deep in the rice paddies and did not go down for more than a week so that most of the seedlings died. As soon as the water went down seed of the same varieties were immediately collected and planted by the dapog system, as it was rather late them. The plots, containing about 2 hectares for the variety test, were prepared at once and the remainder of the field was also plowed. A portion of this was planted with Apostol by transplanting and the greater portion by simply broadcasting the seed. The plots are 2.5 x 20 meters containing 50 equare meters and the seedlings were planted on to the hill, 20 centimeters apart.

In spite of the lateness of planting almost all the varieties in the test showed promising results but as most of them are late-maturing palays they have not been harvested yet and hence the results cannot be included in this report.

Corn.—More extensive work on corn than in any previous years was done in the line of increasing the present production by adapting a better method of culture and improving the best variety for planting in the different parts of the Islands. Beside the La Carlota and Lamao Stations, the Cebu and Isabela Corn Breeding Sub-stations were established this year with the object in view of producing improved varieties of corn adapted to local conditions in those provinces.

Bigger area than in 1919 was cultivated to this crop in both La Carlota and Lamao Stations, of which 5 and 1 hectares, respectively, were devoted to experiments and 6 and 2.50 hectares to seed propagation.

Isabela Corn Breeding Sub-station contains about 50 hectares of land but only about 8 hectares have been planted as the work was started only last September. Just to begin the corn work in Cebu, the Cebu Breeding Station was also established this

year temporarily at Sagay Demonstration Station. Only about a hectare has been planted this year due to lack of land and the work was started too late in the year. Negotiations for securing a larger and better place have been entered into but this station will stay in the Demonstration Station until a new suitable place is obtained. If more funds are available in 1921 it is the intention to establish more of these stations in the different corn regions of the Islands, like Bohol, etc.

The following are excerpts from the different investigations on corn made in the different stations during the year 1920.

General Variety Test.—The object of this experiment was to find out the most promising variety for improvement. At the La Carlota Experiment Station, a test of the varieties Baluga yellow, Bohol white, Cagayan yellow, Calamba yellow, Cebu white, and Moro white was conducted this year.

Of the six varieties tested in that station for last April the Baluga yellow rate the highest among the yellow varieties, and the More white among the white ones.

On November 22 another series of planting of the 6 mentioned varieties was made but the results cannot be included in this report.

SUGAR CANE

Variety Test.—The object of this experiment is to determine which varieties of sugar cane will give good results under the local soil and climatic conditions existing in Occidental Negros Province, or at least in La Carlota district, with particular reference to growth of the plants and tonnage of cane per hectare.

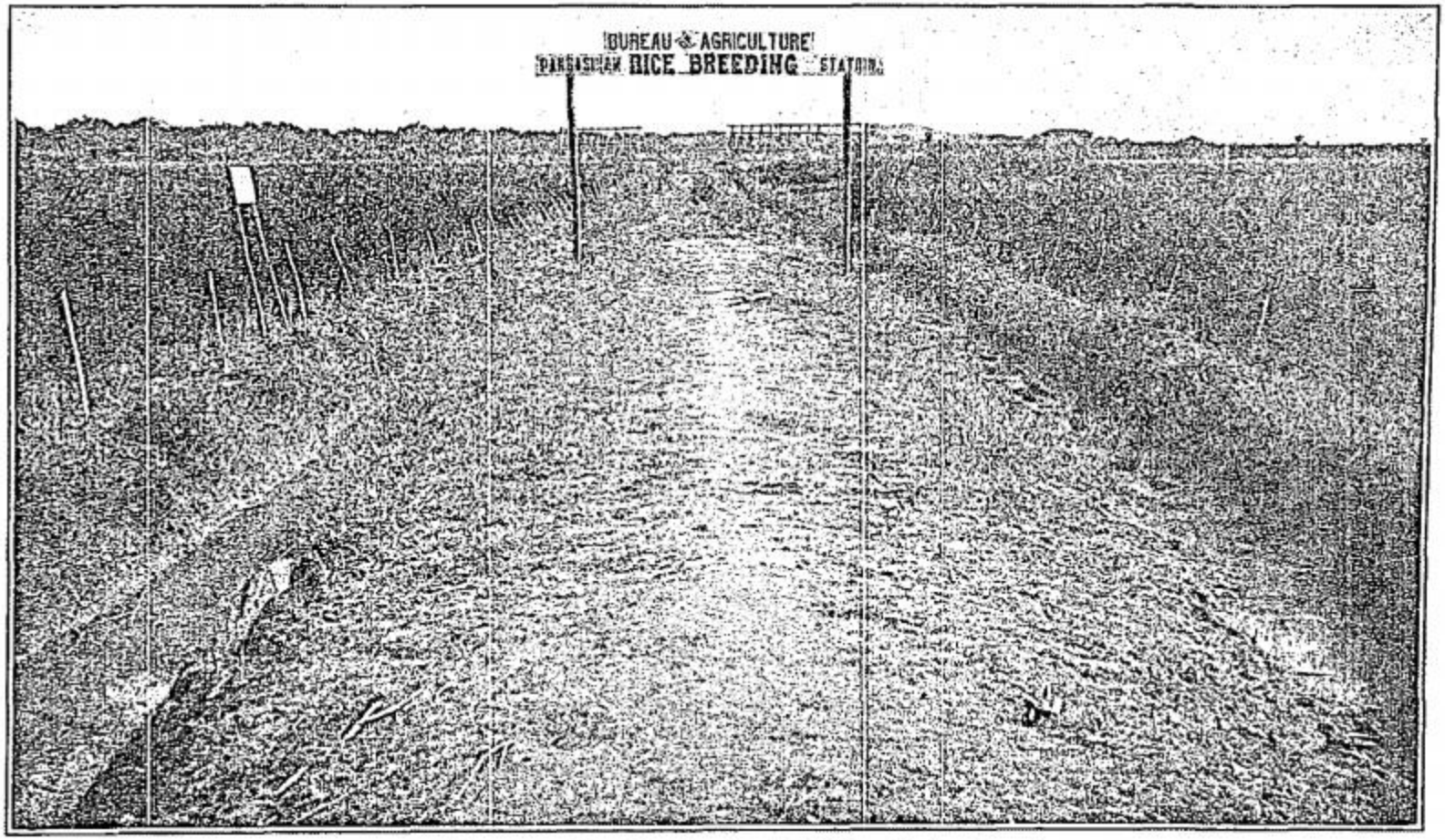
Forty varieties of cane are planted in this test, and all are doing well although a few of them are being attacked by a serious mosaic disease.

Sugar Cane Analysis.—This work is being done to find out what varieties of cane will give the highest yield of sucrose per hectare, taking everything into consideration.

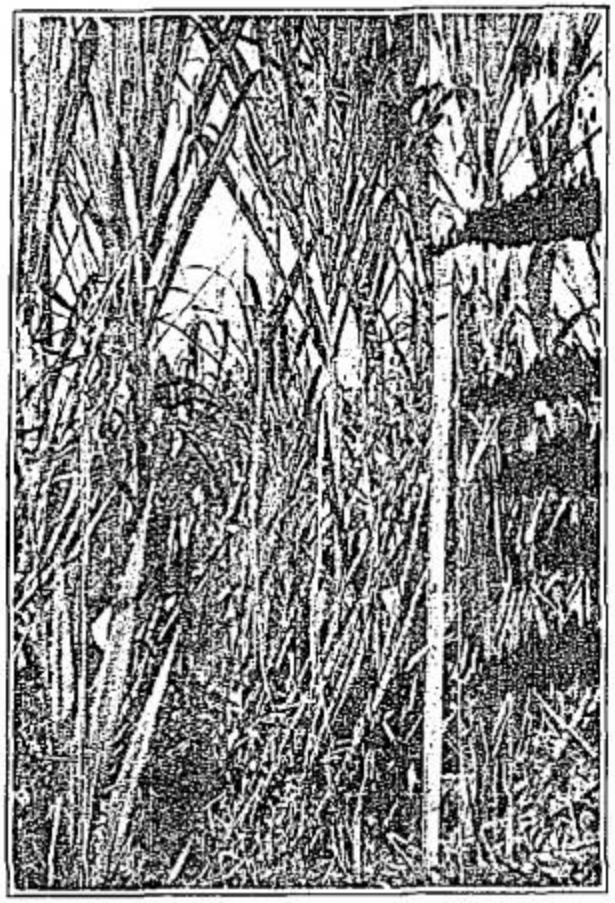
Forty of the old cane varieties and a few of the newly introduced ones we have at La Carlota are being analyzed at present in the sugar laboratory of that station. Samples of 32 varieties of seedling sugar cane from Lamao have been sent to the Bureau of Science for analysis.

Acclimatization Experiment.—The purpose of this is to test newly acquired pest and disease—free cane varieties for adaptation to a given soil and climate.

This work is confined to La Carlota, and under it we have 2 native and 7 foreign regular varieties and 15 seedling varieties. A few of these varieties with the Cebu purple and the Hawaii-109 in the load promise to turn out well.



A view of the Pangasinan Rice Breeding Sub-station, Rosales Pangasinan



(*a*) Sugar cane—Variety Hawaiian 227. La Carlota Experiment Station

(*b*) Sugar cane—Variety Yellow Caledonia. La Carlota Experiment Station

Quarantine work.—This is being carried on to control and prevent the spread of destructive pests and dangerous communicable cane diseases.

The Bureau of Agriculture quarantine plots are at Lamao and Alabang. The native and four foreign varieties of cane are under quarantine now.

Seed Cane Propagation and Distribution, and Demonstration work.—This has for its object the production of improved cane varieties for distribution to both native and foreign cane growers, and to show the Philippine planters how superior varieties of cane and improved methods of cultivation will actually give higher yields.

This work is being accomplished at the various stations of the Bureau of Aigiculture. During the year 1920, 349,707 sugar cane cuttings of different varieties were distributed. This includes the 312,493 points of Negros purple cane which were purchased for distribution.

Fertilizer Tests.—(*a*) Fertilizer Experiments with Negros Purple Sugar Cane-Being Conducted at La Carlota. The object of this is to demonstrate the value of lime and of cheap, common native fertilizing materials, and to determine their effect on the Negros Purple variety.

Burned lime, cane bagasse ashes, farm yard manure, filter press mud or cake, copra meal, and bat guano were applied in varying quantities.

(*b*) Fertilizer Tests With Other Varieties of Cane-Being Conducted at Alabang. This is being done to find out the value of the so-called "Aguila" fertilizer for immature cane plants and for old cane showing poor growth.

Three varieties of cane; namely, Cebu purple, Hawaii-16, and Hawaii-69 were used.

Effect of Distance in Planting.—This is being conducted at La Carlota to determine the effect of wider and of closer planting on the yield of a given variety. Negros Purple cane is being employed in this work.

Breeding work.—This work is being done at Alabang, and its object is to produce new and superior varieties of cane from seeds.

Seed of Badila, Hawaii-20, Hawaii-27, Hawaii-69, Hawaii-109, Hawaii-309, Java-247, Louisiana striped, and "Mountain" (Large, White-Unidentified) were planted in this test. All the varieties, with the exception of the Badila, have germinated already. The young plants from the seeds of Hawaii-20, Hawaii-27, and "Mountain" (Large, White-Unidentified) are showing the best results, so far.

TOBACCO

The most important activity engaged in during the year of this project was the establishment of the Cotabato Tobacco Station at Pikit, Cotabato, in order to produce some varieties of tobacco that will adapt themselves to local conditions in that region and to improve the method of culture thereof. Heretofore the Bureau of Agriculture has carried on its tobacco work only in the Dammao Tobacco Station, Dammao, Gamu, Isabela, and it is hoped that with the addition of another station the problem of bettering our tobacco industry can be properly handled.

The Cotabato Tobacco Station was established in December 1919, but not until July of 1920 did the work on the station really begin. The station is located on the Pikit Military Reservation, which was transferred to the Civil Government. It occupies an area of 15 hectares of good ground apparently free from destructive floods.

During the last tobacco season, there was carried on at both the Dammao and Cotabato Tobacco Stations four distinct lines of work; namely, general cultural and seed selection work, acclimatization of foreign varieties and experimentations on important phases of tobacco culture.

ANIMAL INSURANCE DIVISION

PERSONNEL

The personnel of the division consists of a chief, 3 supervising agents, an investigating agent, a law clerk, a stenographer, 7 agents, 35 assistant agents and 5 clerks. There was a greater increase in the personnel during this year, due to the fact that the Insurance Board was ready to extend the insurance campaign to many provinces and expected as well as to increase the number of animals insured.

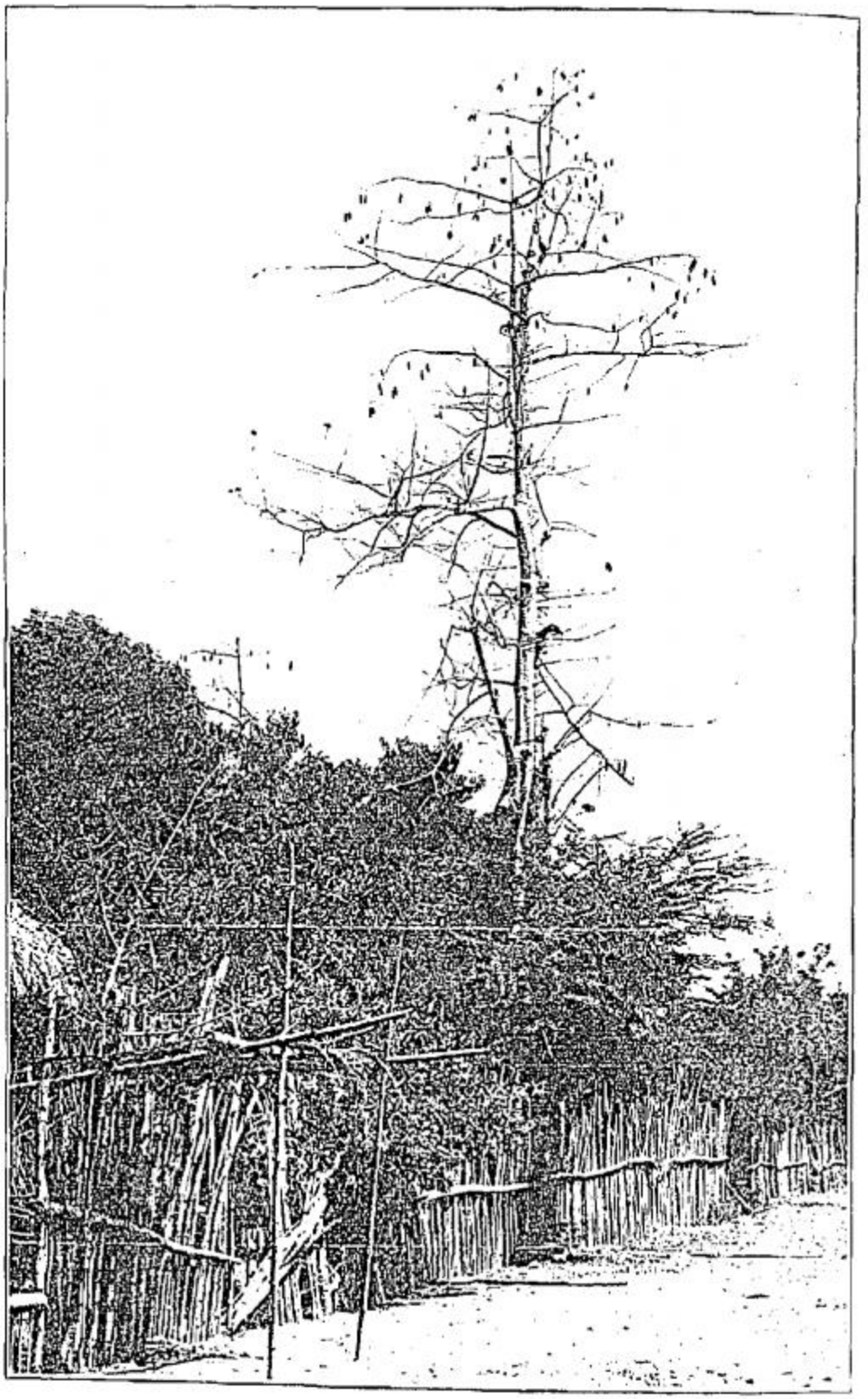
MEMBERSHIP

From April 31, 1919, until the present time, the Work Animal Insurance Association has enrolled 2,745 members, who have paid their corresponding entrance fees.

APPLICATIONS FILED

There has been received from the above mentioned membes, 12,311 applications for the insurance of animals, 6,142 of which were filed between April, 1919 and December 31 of the same year, and the rest, 6,169 during 1920. During the month of May of the present year, many of the agents were engaged in

Florida Sumatra Tobacco. Damao Tobacco Station, Gamu, Isabela



Kapok tree loaded with fruits

identifying said animals and finally in branding them and collecting premiums.

APPLICATIONS APPROVED

Due to the approval of Act No. 2903 authorizing the Animal Insurance Board to begin the work of insurance for any number of animals insured, said Board between the last days of May and December 31 of this year, by means of its president (the Director of Agriculture in this case) approved 7,432 applications for insurance of animals.

NUMBER OF ANIMALS INSURED

Of the 7,432 head of animals insurable, only 4,478 were duly insured. It is calculated that $\frac{2}{3}$ of the rest were found in the municipalities infected after the approval of the corresponding applications, so the applications could not be perfected.

MEMBERSHIP FEES

The entrance fees collected during this year were ₱1,781. Adding to this sum the total collected in 1919 gives a grand total of ₱3,766.

PREMIUMS

The collecting of premiums began in the month of June of this year, and from said month until this date ₱33,903.45 were collected. The total sum of premiums and entrance fees collected amounts to ₱37,669.45. Part of this sum is deposited in the Insular Treasury while the rest is in provincial and municipal treasuries.

DEATH LOSSES

Of the 4,478 animals insured, 37 head died from different causes, the prevailing cause being rinderpest. Out of these 37 deaths, 35 only were indemnified. Payment of indemnity for the other two was not authorized by the Board. These death losses amounted to ₱4,319.50.

INSURANCE EXTENSION

The Animal Insurance Campaign is now spreading in the Provinces of Abra, Albay, Antique, Bataan, Batangas, Bulacan, Camarines Norte, Camarines Sur, Capiz, Cavite, Cebu, Ilocos Sur, Iloilo, Laguna, La Union, Mindoro, Nueva Ecija, Negros Occidental, Pampanga, Pangasinan, Rizal, Romblon, Tarlac, Tayabas, and Zambales.

With the exception of the Provinces of Bataan and Zambales, all of the provinces above mentioned have numbers of animals insured. In each of these provinces, the enthusiasm for the

insurance of work animals is spreading fast, and even those who were opposed to it before, are now realizing the importance of this insurance. The Provinces of Pampanga, Iloilo, Laguna, Capiz, Negros Occidental, and Mindoro have the largest numbers of animals insured and show the greatest interest in the insurance of their animals. Recently the Mindoro Sugar Co. has applied for insurance on two thousand more or less head of work animals, and about four hundred of this number have already been insured and the premiums collected.

GENERAL REMARKS

The Insurance of Work Animals law is proving of great benefit to many municipalities in checking the spread of the diseases of work animals. Our agents have coöperated and are coöperating efficiently with the veterinarian and livestock inspectors to discover the causes of infection as well as to wipe out the diseases.

It is a proved fact also, that the Animal Insurance has helped a great deal to make the caretakers attend better their animals, forcing them to put their animals out of the zone of infection, and warning them against any accident through fault or negligence.

This shows that the Insurance Work not only gives security to the owners of work animals, but greatly helps to lessen the number of deaths by animal diseases; prevents the spread of said diseases and compels the owners or persons in charge to take good care of their animals, according to the instructions given them by this division.

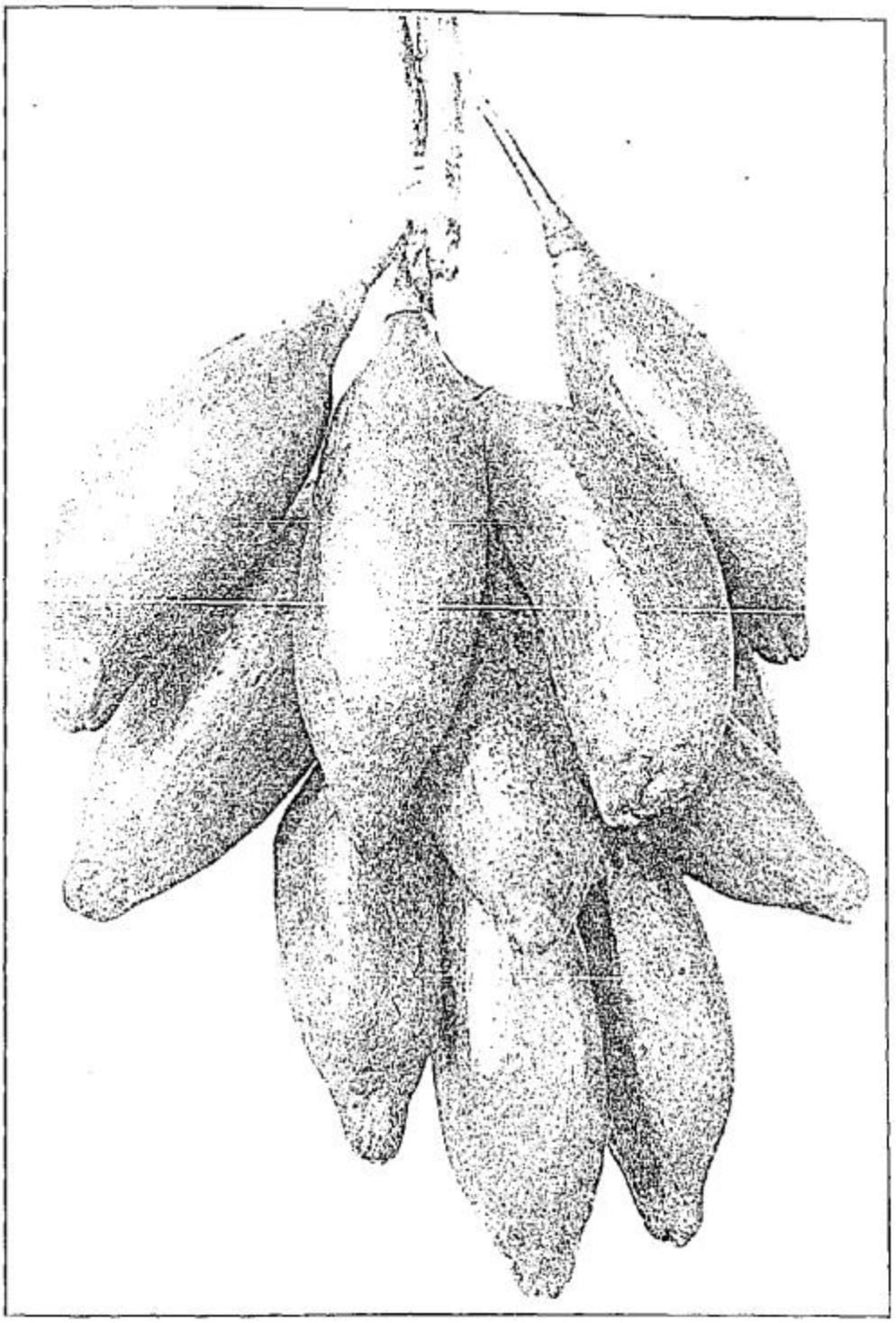
FIBER DIVISION

PERSONNEL

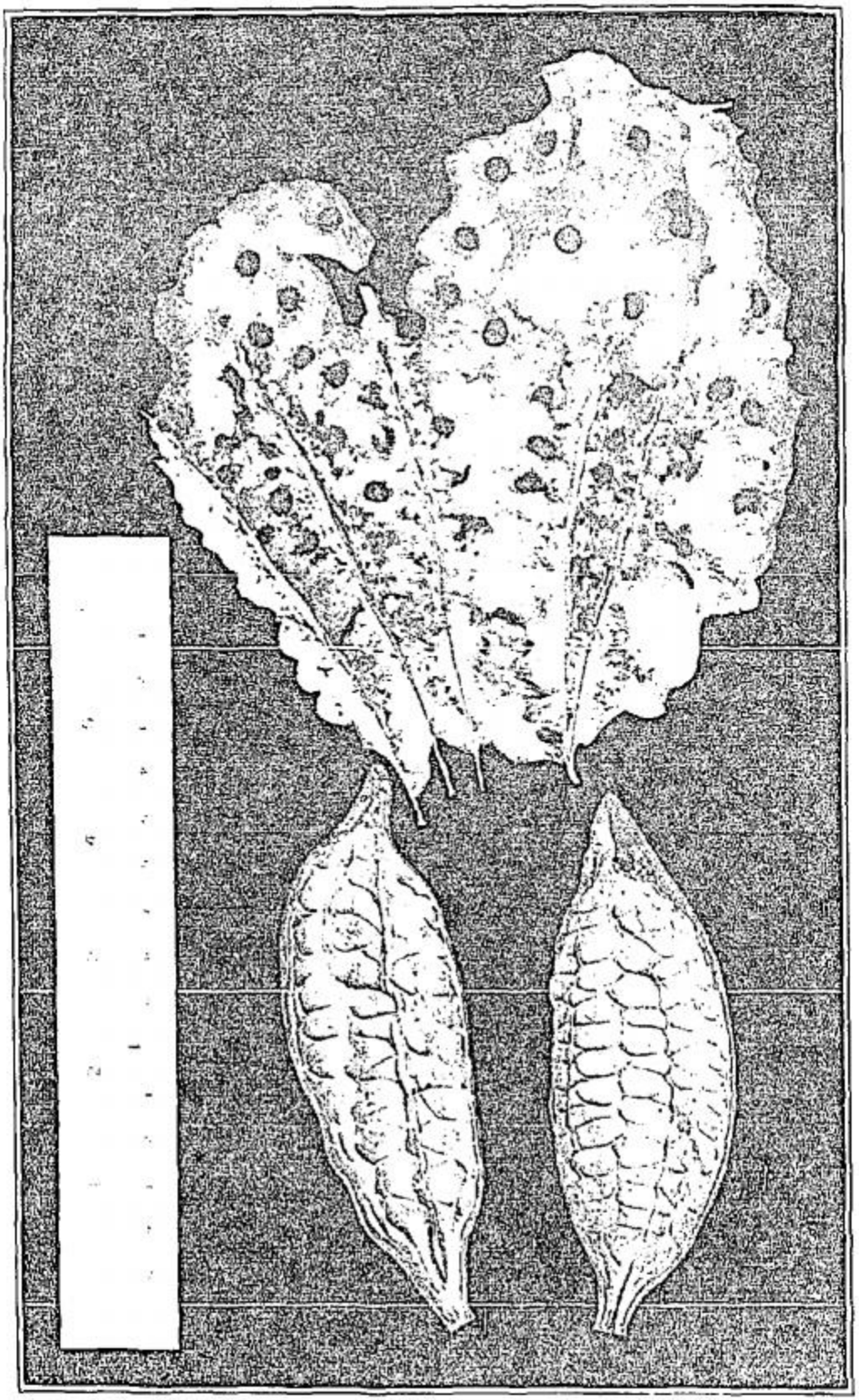
The personnel of the fiber division during the fiscal year ending December 31, 1920, consisted of 1 chief, 1 assistant chief, 3 supervising fiber inspectors, 13 fiber inspectors, 1 educational fiber inspector, 3 acting fiber inspectors 1 of whom is temporary, 17 assistant fiber inspectors, 2 assistant educational fiber inspectors, 1 of whom is temporary, 4 temporary assistants, 2 of whom are Moros doing educational work in Mindanao, 2 assistant agronomists, 1 being in the United States as a *pensionado*, 3 agricultural assistants, 7 clerks and several laborers.

SCOPE OF WORK

The force of supervisor and fiber inspectors attended to the inspection of the grading of fiber in the different fiber grading establishments throughout the Philippine Islands and to the issuance of the proper certificates of inspection for all fiber graded,



Kapok fruits



An open Kapok pod showing the woody husk, papery core (5 carpels) and the seeds embedded in the floss

baled and inspected in accordance with Article III, Chapter 46, Title VII, Book II, of Act No. 2711, approved March 10, 1917 of the Administrative Code. The assistant fiber inspectors performed their duties in helping the supervisors and fiber inspector in the supervision of the grading of fiber at the press or presses to which they were assigned, as well as checking and stamping all bales submitted for inspection and to report any irregularities which they might have noticed in the *bodegas*.

The fiber division conducted a campaign throughout the year to improve the methods of stripping and preparing fiber for the market, and in addition due to the stagnant price of abaca (Manila hemp) fiber, especially during the latter part of the year, the force of fiber inspectors and assistant fiber inspectors of Camarines, Albay, Sorsogon, Samar, Leyte and Surigao were instructed as in the latter part of the year 1918 and early part of 1919 to help in the campaign for the production of more food crops conducted by the other divisions of this Bureau, instead of stimulating the production of abaca (Manila hemp) fiber.

Besides the issuance of certificates for all certified bales of abaca (Manila hemp) fiber, statistics were issued each month of the number of bales of each grade inspected and certified by the fiber inspectors throughout the islands giving the trade useful information on the production and general fiber condition.

The fiber investigation section of the fiber division distributed during the year, fiber plant materials which consisted of 28,018 suckers of maguey, sisal, abaca and other fiber producing plants; and 18,245 grams of seeds of plants producing fiber.

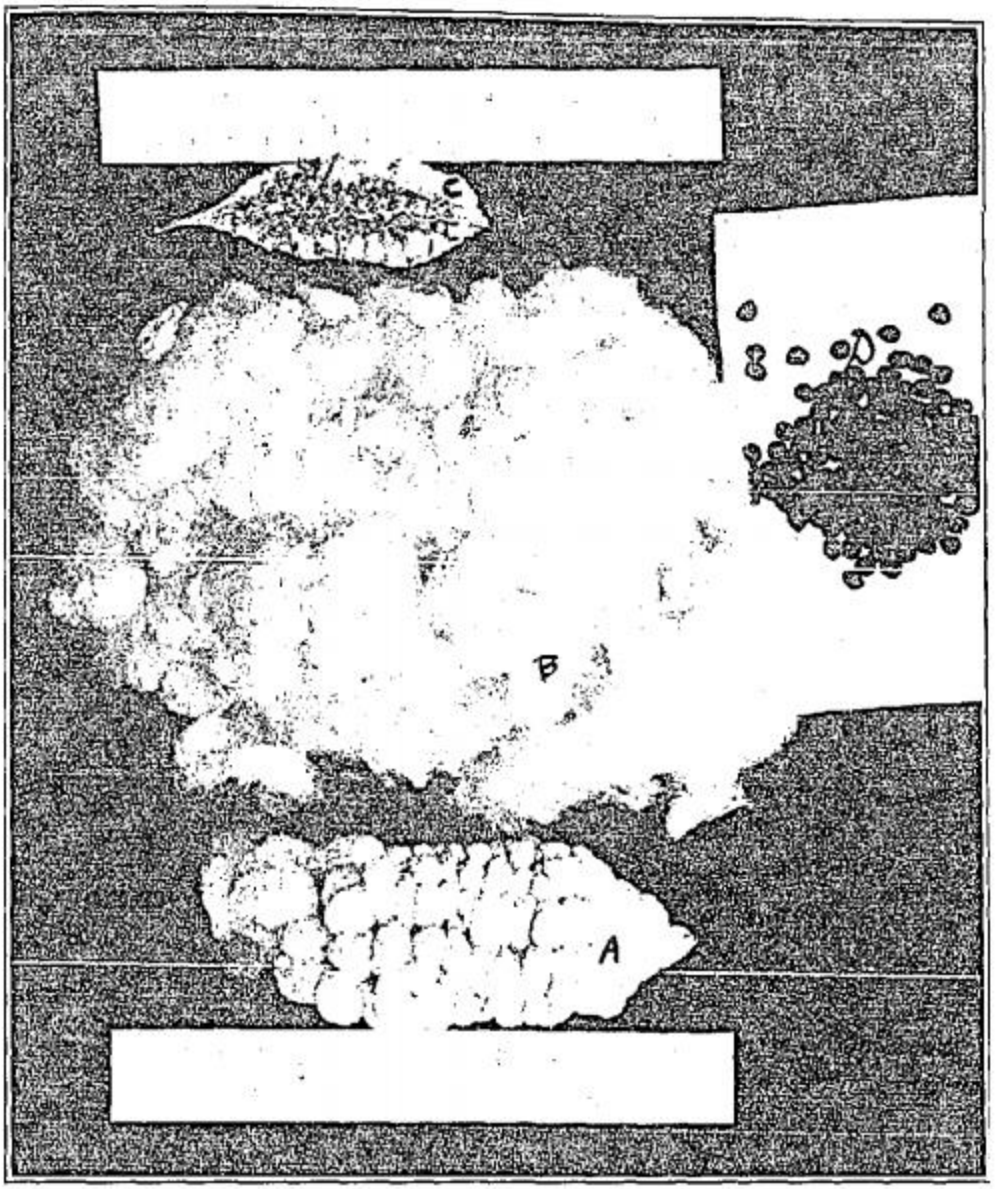
As in the last two years Prieto fiber stripping machines were operated at San Fernando, Cebu, and Sinait, Ilocos Sur, to demonstrate the practicability of stripping maguey and sisal by machinery. The Government stripping machine Irene No. 251 which was installed in San Fernando made a good showing in all respects. Since the installation of this machines three other machines with greater capacity were installed in the Province of Cebu. This machine has given a good return to the Government during the period from January to August of last year, Mr. Claro L. de Guzman, Supervising Fiber Inspector at Cebu, sold ₱3,205.58 worth of the fiber share. Upon the suggestion of Mr. H. T. Edwards of the Department of Agriculture, Washington, D. C., the machine was transferred to Siquijor in October of the same year under the management of Bamban & Company.

FIBER GRADING AND INSPECTION

The grading was kept up to the proper standard and the regulation governing classification, baling and stamping was carried out by the different establishments with less difficulty than before. However, there have been some complaints received from England against abaca which was held one year or more in storage after inspection before exportation. Cuts made by board of arbitration were reported, but those cuts were made on condition and not on classification. Conditional cuts must not be confused with classification cuts. There is a vast difference between the two. The recent cuts suffered by some of the Manila exporters in England were cuts on condition of the fiber at the time of arrival and not on Government grading. Fiber which has been long held in storage and has deteriorated in both strength and color is subject to a conditional cut but many not be subject to a grading cut.

Abaca which is long held in storage will deteriorate both in color and strength. Section 1794 of Article III, Chapter 46, Title VII, Book II of Act No. 2711, approved March 10, 1917 of the Administrative Code, provides: "Fiber which has been duly inspected, graded, baled, and shipped from one port to another in the Philippine Islands, shall not be subject to further inspection at the port of destination, except upon written complaint received by the Chief Fiber Inspector." Therefore, in the case of long stored bales deteriorating, the Chief Fiber Inspector cannot by law order a reclassification except upon a written complaint against the bales in question.

The complaints received from British buyers in the United Kingdom during the year were limited to a few Government marks. Upon a thorough examination of these marks it developed that the complaints were based mostly on two factors: first, deterioration in color; and second, the presence of weak fiber. Under the present efficient Government system, the fiber division traced these defects in the marks against which the complaints were received and discovered that the deficiency was in great part caused by long storage of the bales in question, over which the fiber division had no direct control, as explained above, and the responsibility for which rested entirely upon the local exporters who shipped such deteriorated parcels and did not avail themselves of the section of the Fiber Law, quoted above, which they could have employed to rectify the classification before exportation.



A. Kapok pod stripped of the woody husk
B. Kapok floss contained in one pod after being cleaned and beaten
C. The papery core to which the floss is attached
D. Seeds contained in one pod

Abaca plantation of Sinibuyas variety, the source of Tagal braid fiber

It seems that the criticism made during the year of the local enemies of the law based upon the aforementioned complaints strengthens the usefulness of the law rather than undermines it.

GRADING STATIONS AND ESTABLISHMENTS

During the year just past, there were designated 35 grading stations and 120 grading establishments, an increase of 3 grading establishments over the previous year.

ABACA TESTS

There are 35 so-called varieties of Abaca under culture in La Carlota Experiment Station since 1912. Our observations for this year confirm that of last year to the effect that since the destruction of the irrigation system in the above station in August 1919 all of the abaca varieties could not attain their proper development. Everyone of them has been so affected that they mature and develope stalks which range in length from 69 cm. (Lagurhuan Dogami) to 256 cm. (Maguindanao) with a vast majority below 200 cm. and yielding fibers below normal in length and the fiber content has decreased in many cases.

CONCLUSION

As in previous reports, many of the statistical tables such as detailed reports of the sale of animals, livestock purchases, crop production, breeding records, inspections, publications, fiber records, plant propagation records on rice, sugar, corn, tobacco, laboratory tests, maps, graphic charts, etc., were not incorporated herewith, on account of economizing both time in preparation, and space required. They are, however, available in the several divisions of the Bureau and may readily be furnished when detailed information on any of these subjects is required.

Respectfully submitted,

ADRIANO HERNANDEZ,
Director of Agriculture.

To the Honorable
the SECRETARY OF AGRICULTURE AND
NATURAL RESOURCES,
Manila, P. I.

180125——5

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PUBLICATIONS OF THE BUREAU OF AGRICULTURE.

BULLETINS.

No. 11. Press Bulletin: Part I, Seed Distribution; Part II, Need of Diversified Farming; Part III, The Avocado; and Part IV, Publications of the Bureau of Agriculture. (English and Spanish.)
No. 12. Abaca (Manila Hemp), Revised. (English and Spanish.)
No. 13. The Cultivation of Maguey. (Spanish.)
No. 14. El Cultivo del Sésamo en las Islas Filipinas. (Spanish.)
No. 16. El Cultivo del Tabaco en las Islas Filipinas. (Spanish.)
No. 17. Cultivo del Cocotero. (Spanish.)
No. 27. Citriculture in the Philippines. (English.)
No. 28. The Mechanical Transmission of Surra by Tabanus Striatus. (English.)
No. 29. Duration of Infectiveness of Virulent Rinderpest Blood in the Water Leech, Hirudo Boyntoni Wharton. (English.)
No. 30. Experiments upon the Transmission of Rinderpest. (English.)
No. 31. An Atypical Case of Rinderpest in a Carabao. (English.)
No. 32. Plant Propagation in the Tropics. (English and Spanish.) (See price below.)
No. 33. Cane Production and Sugar Manufacture in the P. I. (English.) (See price below.)
No. 34. Tobacco Growing in the Philippines. (English.)
No. 35. Coconut Palm: Its Culture and Uses. (English.) (See price below.)
No. 37. Rice in the Philippines. (English.) (See price below.)

CIRCULARS.

No. 7. Coconuts. (English and Spanish.)
No. 12. Plant Pests and Remedies Therefor. (English and Spanish.)
No. 14. Maize Leaf Fodder. (Spanish.)
No. 15. The Mango. (English and Spanish.)
No. 16. Pineapple Culture. (English and Spanish.)
No. 17. Maize Culture. (English.)
No. 20. The Mango Bark Borer. (English and Spanish.)
No. 21. Kapok Culture. (English and Spanish.)
No. 22. Maguey (Cantala) and Sisal Culture. (English and Spanish.)
No. 23. Locust Pest. (Spanish.)
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No. 26. Cacao Culture. (English and Spanish.)
No. 27. Banana Culture. (English and Spanish.)
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No. 29. Guinea Grass. (English and Spanish.)
No. 30. Cultural Directions for the Papaya. (English and Spanish.)
No. 32. Sugar-cane Cultivation. (English and Spanish.)
No. 33. La Fabricación de Azúcar Mascabado. (Spanish.)
No. 34. Peanuts. (English.)
No. 35. Cultural Directions for Para Rubber. (English.)
No. 36. The Vegetable Garden. (English and Spanish.)
No. 37. Some Observations on Rats and Their Control. (English.)
No. 38. Coconut Culture. (English.)
No. 39. Cultural Directions for Banana. (English and Spanish.)
No. 40. Suggestions for Selection and Saving of Garden Seed. (English and Spanish.)
No. 41. Increasing Rice Crop by Seed Selection. (English and Spanish.)
No. 42. Instructions for Planting Vegetables. (English and Spanish.)
No. 43. Instructions for Irish Potato Growing. (English and Spanish.)
No. 44. Propagation of Pili Nuts. (English.)
No. 45. Instructions for Planting Lawns to Bermuda Grass. (English.)
No. 46. Instructions for Planting Upland Palay. (English and Spanish.)
No. 47. Instructions for Planting Lowland Palay. (English and Spanish.)
No. 48. Propagation of Sweet Potatoes. (English.)
No. 49. Propagation of Cacao. (English.)
No. 50. Valuable Forage Crops for the Philippines. (English.)
No. 51. Propagation of Lumbang. (English.)
No. 52. Propagation of Peanuts. (English.)
No. 53. Propagation of Chico. (English.)
No. 54. Culture and Uses of Cowpeas. (English.)
No. 55. Use Corn for Food. (English.)
No. 56. Propagation of Guinea Grass. (English.)

PUBLICATIONS OF THE BUREAU OF AGRICULTURE—Ctd.

CIRCULARS—Continued.

No. 57. Propagation of Lanzones. (English.)
No. 58. How to Select and Store Seed Corn by "Halayhay" Method. (English.)
No. 59. Cultivation of Ilang-Ilang. (English.)
No. 60. Indigo. (English.)
No. 61. Green Manure, Soiling and Cover Crops. (English.)
No. 62. "Dapog" Method in the Culture of Rice. (English and Spanish.)
No. 63. Roselle. (English.)
No. 64. Propagation of Violetas, (Barleria cristata). (English.)
No. 65. Propagation of Coffee. (English.)
No. 66. Mungo on Rice Land. (English.)
No. 67. Castor Oil Beans. (English and Spanish.)
No. 68. The Camote and Cassava. (English.)
No. 69. Saving and Investing (Rural Credit). (Spanish.)
No. 70. Saving and Investing (Rural Credit). (Pangasinan.)
No. 71. Saving and Investing (Rural Credit). (Bicol.)
No. 72. Saving and Investing (Rural Credit). (Visayan-Samar.)
No. 73. Saving and Investing (Rural Credit). (Visayan-Cebu.)
No. 74. Saving and Investing (Rural Credit). (Tagalog.)
No. 75. Saving and Investing (Rural Credit). (Visayan-Iloilo.)
No. 76. Saving and Investing (Rural Credit). (Pampango.)
No. 77. Saving and Investing (Rural Credit). (English.)
No. 78. Saving and Investing (Rural Credit). (Ilocano.)
No. 79. Directions for Budding. (English.)
No. 80. Bud-Rot of Coconut. (English and Spanish.)
No. 81. Method of Determining Whether or Not a Coconut Tree is Attacked by Bud-Rot. (English and Spanish.)
No. 82. Why not eliminate the "uang" of Coconut. (English and Spanish.)
No. 83. Instructions for the Control of Rice Cut-Worms. (English and Spanish.)
No. 84. Pests of Maize. (English and Spanish.)
No. 85. Tobacco Pests. (English.)
No. 86. Method of Controlling Maya. (English and Spanish.)
No. 87. Instructions for Combating the Rat Pest. (English and Spanish.)
No. 88. Abacá Root Weevil. (English and Spanish.)
No. 89. Control of Rice Bug, "atangia." (English and Spanish.)
No. 90. Rubber Culture. (English.)
No. 91. Coffee Culture. (English.)
No. 92. Brief Instructions for Running an Incubator. (English.)
No. 93. Practical Instructions for the Control of Tomato Turtle, Leaf-feeding Beetle (English.)
No. 94. Poultry Notes. (English and Spanish.)
No. 95. Method of Controlling Certain Pests and Diseases of Maize. (English and Spanish.)
No. 96. Notes on Swine Breeding in the Philippines. (English and Spanish.)
No. 97. Planting Instructions for Abacá. (English.)
No. 98. Planting Instructions for Maguey and Sisal. (English.)
No. 99. Preparation of Maguey and Sisal Fibers by Retting. (English.)
No. 100. The Panama Hat Palm-Carludovica Palmata. (English.)
No. 101. Suggestions Re Process of Castration. (English.)
No. 102. Foot-and-Mouth Diseases. (English and Spanish.)
No. 103. Rinderpest and Its Prevention. (English.)
No. 104. Raising Ducks. (English and Spanish.)
No. 105. Preparation of Papain. (English.)
No. 106. Propagation of Mulberry Cuttings. (English.)
No. 107. The Culture and Uses of the Castor Oil Beans. (English.)
No. 108. Instructions for Planting Patani Beans. (English.)
No. 109. Propagation of Ates. (English.)
No. 110. Ates (Sugarapple). (English.)
No. 111. Vegetable Growing. (English.)
No. 112. Soy Beans. (English.)
No. 113. Wampee. (English.)
No. 114. Bordeaux Paste for Gummosis of Citrus Trees. (English.)
No. 115. Yam Culture. (English.)
No. 116. The Four Spotted Corn Silk Beetle. (English.)
No. 117. Rice Pests. (English and Spanish.)
No. 118. Rice Farming. (English and Spanish.)

PUBLICATIONS OF THE BUREAU OF AGRICULTURE—Ctd.

CIRCULARS—Continued.

No. 119. Cultural Directions for Field Crops and Vegetables. (English.)
No. 120. The Cultivation and Uses of Roselle. (English.)

PUBLICATIONS FOR SALE.

Bulletin No. 32, "Plant Propagation and Fruit Culture in the Tropics," English and Spanish, ₱1 or ₱1.40 postpaid.
Bulletin No. 33, "Cane Production and Sugar Manufacture in the Philippine Islands," paper cover, ₱1 or ₱1.40 postpaid; bound, ₱3 or ₱3.45 postpaid.
Bulletin No. 35, "The Coconut Palm; Its Culture and Uses," ₱1 or ₱1.20 postpaid.
Bulletin No. 37, "Rice in the Philippines," ₱1 or ₱1.40 postpaid.
Manual de la Industria Azucarera de las Islas Filipinas, ₱4 or ₱4.50 postpaid.

All communications should be addressed to the Director of Agriculture, Manila, P. I.

E R R A T A

Page	Paragraph	Line	AS IT IS	AS IT SHOULD BE
12	1	2	of the work	should be eliminated
19	1	2	is correct	is not correct
20	4	1	required	retired
28	2	2	been	has been
31	4	1	nonexistant	nonexistent
35	2	5	by the treasurer	should be eliminated
36	3	3	increase	increased
47	3	2	district	districts
49	3	7	others	other
52	1	3	semi-annually	semi-annual
52	7	7	adviser	advisor
55	3	7	gives	give
56	5	8	edge	age
56	6	3	ware	were
57	2	14	Them	then
58	4	3	More	Moro
59	4	2	Aigiculture	Agriculture
60	3	1	was	were
60	6	1	membes	members
62	6	1	supervisor	supervisors
63	1	4&5	inspector	inspectors
64	7	14	many	may